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# A Social Well-Being Analysis of Five Proposed Alternative Program Directions

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80523

September 17, 1979

Dr. Peter G. Ashton
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P.O. Box 2417
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Dear Pete:

Accompanying this letter is a copy of my report to you entitled, "A Social Well-Being Analysis of Five Proposed Alternative Program Directions." By submitting this report at this time, I have fulfilled all requirements and stipulations of Cooperative Aid Agreement 16-716CA under terms of which I have worked jointly with your office and the Rocky Mountain Forest and Range Experiment Station. I think you will find the report to have successfully met our hopes for the social well-being analysis; there are real grounds for confidence in the results that we report. The procedures worked smoothly and, even though we handled the data in the most conservative possible fashion, the procedures yielded discriminating results.

It goes without saying that your support has been absolutely critical in the success of this project, and I fully appreciate the full measure of assistance which you have provided. It has been a pleasure to have an opportunity to work with you and your office.

Sincerely,

David M. Freeman

David M. Freeman
Associate Professor

DMF:hf
Encl

# A Social Well-Being Analysis of Five Proposed Alternative Program Directions

A Report Prepared Under
Cooperative Aid Agreement 16-716CA
with the Office of Programs and
Legislation, U.S. Forest Service,
the Rocky Mountain Forest and Range
Experiment Station, U.S. Department
of Agriculture

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August 17, 1979

# SUMMARY OF THE SOCIAL WELL-BEING ANALYSIS OF FIVE RPA ALTERNATIVE PROGRAM DIRECTIONS

Five proposed APDs were evaluated according to two criteria which, taken together, define the meaning of social well-being--futures foregone for choice opportunities and polarization of social conflict cleavages estimated to be associated with implementation of each APD. That APD which is found to forego the fewest choice opportunities was preferred. That APD which was estimated by panels to be the least polarizing was preferred from a conflict standpoint.

APDs were ranked according to the amount to which they were each estimated to forego futures for activities, and engender polarized cleavages among affected resource activity groups. The results of each analysis and the combined result of the two analyses are as follows:

| APD | FUTURES FOREGONE RANKING | CONFLICT POLARIZATION RANKING | SOCIAL WELL-BEING SUM OF RANKINGS ACROSS ANALYESS |
|---|---|---|---|
| 1 | 3 | 4 | 7 |
| 2 | 4 | 2 | 6 |
| 3 | 1 | 3 | 4 |
| 4 | 5 | 2 | 7 |
| 5 | 2 | 1 | 3 |

highest ?

APD 5 scores the lowest over-all ranking by virtue of its second rank in futures foregone analysis and its first rank in conflict analysis. APD 3 then takes second place in the over-all ranking with a value of 4. APD 2 assumes third place in the over-all ranking with a value of 6 and APDs 1 and 4 tie for fourth and last place with sums of 7 each. APD 5 is clearly preferable from the over-all social well-being standpoint, followed in turn by APDs 3, 2 and 1/4.

# EXECUTIVE SUMMARY

The Forest and Rangeland Renewable Resources Planning Act (RPA, 1974) directs the Secretary of Agriculture to assess periodically the national forest and rangeland resource situation and to submit, at regular intervals, recommendations for long-range Forest Service Programs essential to meet future needs. This document reports a social well-being evaluation of five Alternative Program Directions (APDs) proposed by the U.S. Forest Service under the terms of RPA legislative mandate. Each APD represents a different mix of resource uses by incorporating a certain level of products and services yielded by the National Forest System and a certain level of assistance to the private sector. Each APD has been evaluated in terms of its estimated impact on 106 Potential Natural Vegetation Communities (PNC's) constituting the land and water base of the continental United States.

Social well-being is defined in terms of sustaining choice contexts. Therefore, to sustain and/or enlarge the context of choice opportunities on the land base for present and future generations is to enhance social well-being. To operationalize the context of choice concept, two dimensions are examined:

1) Futures for choice opportunities estimated to be foregone by the implementation of each APD.
   That APD which is found to forego the fewest choice opportunities for ten activities, upon which data could be made available as input for this study, is to be preferred.
2) Social conflict patterns estimated to be affected by the implementation of each APD. That APD which is estimated by panels of informed judges to be the least polarizing is preferred from a conflict standpoint.

## Summary of the Futures Foregone Analysis

APDs were ranked from low to high in each PNC according to futures foregone scores calculated for ten activities (e.g. wood harvest, domestic grazing, dispersed recreation). Lowest rank was assigned to the APD foregoing the least future for a given activity and highest rank was assigned to the APD in each PNC obtaining the highest futures foregone score. Examining the results, APDs break out in three distinct sets. APDs three and five nearly tied for first ranking--the first set--having scores close together at 501 and 505 respectively. Set two follows and consists of APDs one and two which are also nearly tied for second rank with scores of 520 and 525. APD 4 is separated from the third and fourth ranked APDs by a wide margin. Over-all APD 4 is a dominant loser in the futures foregone contest.

Futures Foregone Rankings of APDs

| Rank | APD | Scores |
|---|---|---|
| 1 | 3 | 501 |
| 2 | 5 | 505 |
| 3 | 1 | 520 |
| 4 | 2 | 525 |
| 5 | 4 | 591 |

## Summary of the Conflict Polarization Analysis

On the basis of the futures foregone analysis a sub-set of 21 PNCs was selected from the larger set of 106 PNCs for a conflict polarization analysis because each of the 21 chosen PNCs obtained futures foregone scores equal to, or exceeding .5 on the futures foregone scale. The significance of the .5 threshold on the futures foregone scale is that it represents the lower end of the inflection point on the futures foregone curve above which losses in activities become much harder to compensate. In essence, beyond a certain point on any given PNC, one more unit of loss becomes more intensely missed and of greater significance than preceding units of loss. The .5 level on the futures foregone scale represents that point and therefore all PNCs sustaining a loss equal to or exceeding that .5 level on any one or more of the activities were held aside for a conflict polarization analysis.

The twenty-one PNCs selected for conflict analysis were each examined by two panels working independently, but with the same conflict analytic procedures. Panelists employed a set of procedures for estimating which activity groups, affected by the five different projected APD resource mixes for 1990, would take positive, negative, or neutral positions relative to each APD's impact on each of the PNCs subjected to the conflict analysis. The conflict position data generated in the workshop then were employed in a conflict polarization analysis, to rank the five proposed APDs according to the degree of polarization which each APD was estimated by the panels to generate on each PNC.

Results of the conflict polarization analysis reveal that APD 5 was found to be the least polarizing of the APDs across the 21 PNCs. APD 3 followed in second place which was, in turn, followed by APDs 2 and 4 tied for third place. APD 1was found to be the most polarizing.

National APD Ranking
By Conflict Polarization

| Rank | APD | Rank Score |
|---|---|---|
| 1 | 5 | 46 |
| 2 | 3 | 51 |
| 3 | 2 | 52 |
| tie | tie | tie |
| 3 | 4 | 52 |
| 4 | 1 | 53 |

## Synthesis and Conclusion

The two dimensions of social well-being--futures for choice opportunities foregone and social conflict polarization--represent separate analyses which were performed independently and each can stand alone. Yet, there is value in juxtaposing the results of the two analyses keeping in mind that units of futures foregone are very different from units of conflict polarization. It is, nevertheless, of use to examine the APD rankings which emerged out of the two analyses. When results of the two analyses are combined, the reader will note that there is no clear and dominant winner--i.e., an APD which clearly wins on both dimensions of the analysis. There is no clear and dominant loser either--an APD that is last ranked on both analyses. APD five which is first ranked by the conflict analysis is second ranked by the futures foregone analysis. APD 1 which is last ranked in terms of conflict is third ranked in the futures foregone analysis.

### Synthesizing Futures Foregone with Conflict Polarization APD Ranks

| APD | Futures Foregone Ranking | Conflict Polarization Ranking | Social Well-Being Sum of Rankings Across Analyses |
|---|---|---|---|
| 1 | 3 | 4 | 7 |
| 2 | 4 | 2 | 6 |
| 3 | 1 | 3 | 4 |
| 4 | 5 | 2 | 7 |
| 5 | 2 | 1 | 3 |

Yet, it is possible to sum the futures foregone rank with the conflict polarization rank for each APD and then compare APDs in terms of their over-all social well-being rank. If one does this, one quickly sees that APD 5 scores the lowest over-all ranking by virtue of its second rank in futures foregone analysis and its first rank in conflict analysis. APD 3 then takes second place in the over-all ranking with a value of 4. APD 2 assumes third place in the over-all ranking with a value of 6 and APDs 1 and 4 tie for fourth and last place with sums of 7 each. In this sense, APD 5 is clearly preferable from the over-all social well-being standpoint, followed in turn by APDs 3, 2 and 1/4.

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# PREFACE

In 1974, Congress enacted the Forest and Rangeland Renewable Resources Planning Act (RPA). This Act provided for long-term national renewable resource planning. RPA directs the Secretary of Agriculture to assess periodically the national forest and rangeland resource situation and to submit, at regular intervals, recommendations for long-range Forest Service Programs essential to meet future needs.

RPA, in conjunction with the National Planning Act of 1976, dictates two primary planning activities: (1) assessment and (2) program construction. *Assessment* includes a physical inventory and description of the overall resource situation with regard to problems and opportunities, potential supply and likely demand, and a view of prices related to various output levels. Based on the assessment, a *Renewable Resources Program* is developed at the Secretary of Agriculture's recommendation for Forest Service actions to help resolve problems, take advantage of opportunities identified in the assessment, and display various program alternatives from which choices are made. This report presents an analysis of the social well-being implications of five proposed alternative program directons (APD's) which have emerged out of the Renewable Resources Program.

Conducting an analysis of proposed alternatives would be straightforward if competing resource uses could be ranked in order of their relative economic worth to society. Unfortunately, many competing uses, preferences, and values are non-commensurable and economic dollar accounts fail to capture the social non-economic effects. In order to cope with this fact, this social well-being analysis--employing data generated by the *National Interregional Multi-Resource Use Analytical System* (NIMRAS)--examines each of the five APDs in a manner that makes non-economic social well-being considerations a useful supplement to the traditional economic and technical analyses. It is the purpose of this report to present a social well-being analysis of the five APDs in a manner that will allow the conclusions to be integrated into the larger analytical effort. Work undertaken for this report was conducted under a Cooperative Aid Agreement between the U.S. Forest Service, Office of Programs and Legislation; the Rocky Mountain Forest and Range Experiment Station, USDA; and David M. Freeman, Department of Sociology, Colorado State University.

# ACKNOWLEDGMENTS

Work on the social well-being analysis presented here has been undertaken with support from a Cooperative Aid Agreement between myself as Principal Investigator at Colorado State University, and Dr. Peter G. Ashton, Office of Programs and Legislation, in cooperation with the Rocky Mountain Forest and Range Experiment Station, USDA Forest Service. I wish to express my thanks to Dr. Ashton for his support--intellectually and administratively--throughout the implementation of this project. In addition, members of Dr. Ashton's staff have contributed their energies by working on the initial analysis of the data upon which this report is based. For this, thanks go to James Pickens, Judy Miller, Brenda Landrum, David DeLucia, Sherry LaPrate, and Pat Scully. Mr. Coryell A. Ohlander, Staff Hydrologist, Division of State and Private Forestry, Region 2, Denver, Colorado, deserves a note of special appreciation for his willingness to help us with the operationalization of central ideas; his contribution is reflected in several parts of the report. In addition, thanks are expressed to JoAnne Tremaine for her assistance in conducting the social conflict workshop and to Lenora Bohren for her voluntary work on the editing of this report. The work of my own assistants, some of which was purely voluntary, has been most appreciated. To Kevin Jones, Jan M. Quint and R. Scott Frey go my thanks along with warm regard.

David M. Freeman

David M. Freeman
August 17, 1979

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## CHAPTER 1: INTRODUCTION

### 1.1 Purpose

This document reports an evaluation of five *Alternative Program Directions* (APDs) proposed by the U.S. Forest Service. Each APD represents a different mix of resource use by incorporating a certain level of products and services yielded by the National Forest System and a certain level of assistance, such as incentive money or technical help, to the private sector. *Market outputs* from the National Forest System (NFS) include such products as timber and range forage, whereas *nonmarket outputs* include amenities such as wildlife and wilderness. The proposed APD's under consideration can be summarized as follows:[1]

APD 1. Provide high market and non-market outputs from the National Forest System, and high-level assistance to private forestry.

APD 2. Provide moderate market and non-market outputs from the National Forest System, and moderate-level assistance to private forestry.

APD 3. Provide low market and non-market outputs from the National Forest System, and low-level assistance to private forestry.

APD 4. Provide moderate market and low non-market outputs from the National Forest System, and low-level assistance to private forestry.

APD 5. Provide low market and high non-market outputs from the National Forest System, and moderate-level assistance to private forestry.

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[1] See, for the full description of each APD: Forest Service, USDA. Final Environmental Statement and Renewable Resource Program--1977 to 2020. Forest Service South Agriculture Building, 14th and Independence Avenue, S.W. Washington, D.C. n.d.

Each APD has been evaluated in terms of its estimated impact on 106 *Potential Natural Vegetation Communities* (PNC's) constituting the land and water base of the continental United States. Each PNC is defined by one or more genera of shrubs, grasses, and/or forests.[2] PNC's were used as the unit of analysis because of: (1) their smaller size relative to the larger NFS Regions, (2) their conformity to the physical inventory variables utilized by NIMRAS; and (3) their homogeneous character allowing them to respond in a uniform manner to APD manipulations.

Two social well-being dimensions have been used in evaluating each PNC:

(1) Futures for choice opportunities estimated to be foregone by the implementation of each APD.

(2) Social conflict patterns estimated to be affected by the implementation of each APD.[3]

### 1.2 Specific Objective

The objective of this research has been to perform a social well-being analysis of five proposed APD's so that decision-makers in advance of program commitments can rank alternative APD's according to their strategic social effects across the continental United States. To achieve this objective, two methods of measuring social well-being were employed—futures foregone and social conflict polarization. Each method is designed to measure one dimension of social well-being. Futures foregone and social conflict polarization are integrated in order that they contribute to social well-being conclusions regarding the anticipated affect of each APD upon each PNC (See Figure 1.2.1).

---

[2] See, *The National Atlas of the United States of America*, United States Department of the Interior - Geological Survey, Washington, D.C., 1970, pp. 90-91.

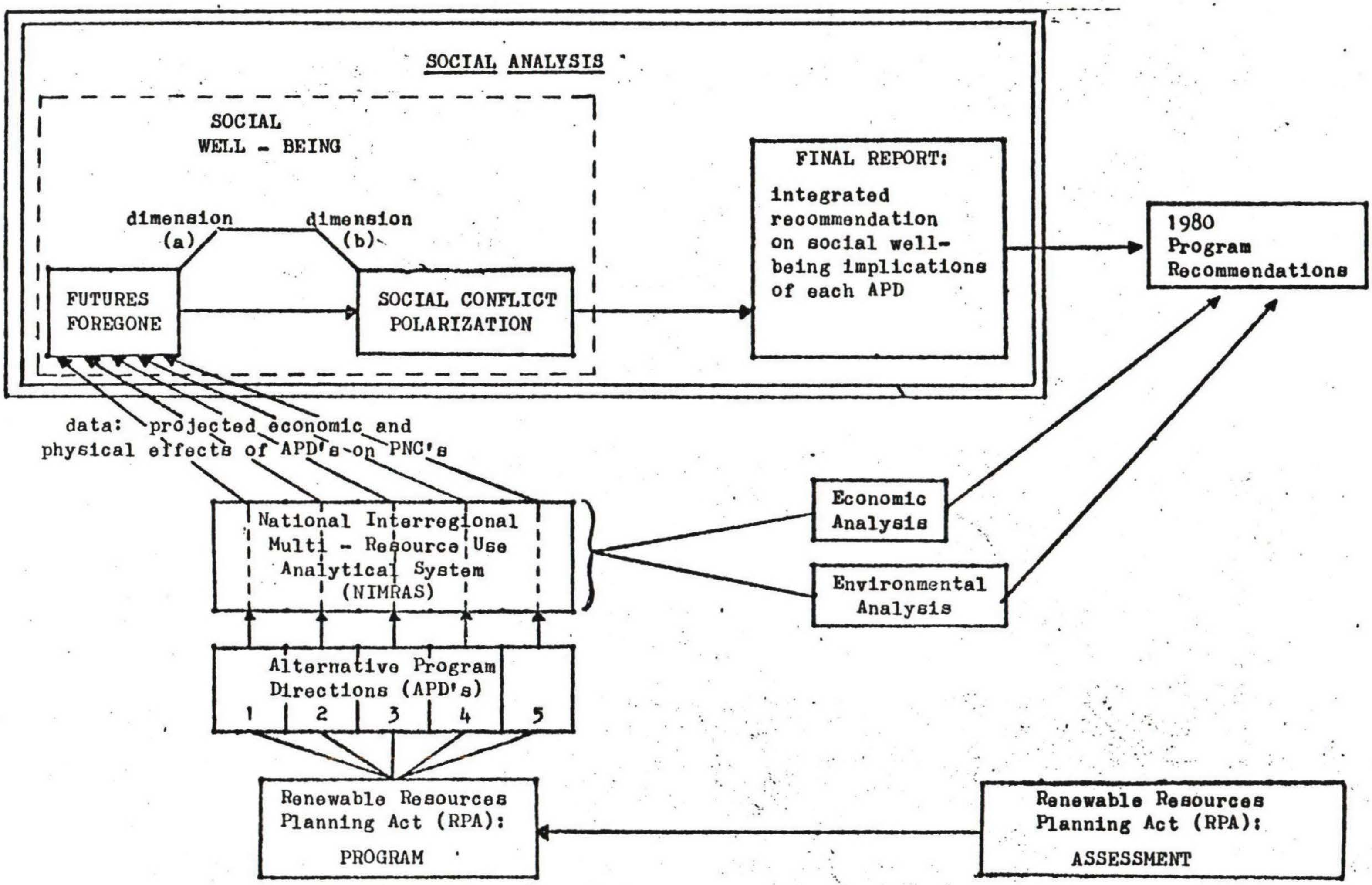
[3] For a discussion of the futures forgone dimension see: David M. Freeman, "A Social Well-Being Framework for Assessing Resource Management Alternatives," *Denver Journal of Law and International Policy*, 1976:6 pp. 377-393 (reprinted in Ravinder K. Jain and Bruce Hutchings eds., *Environmental Impact Analysis: Emerging Issues in Planning*, Urbana: University of Illinois Press, 1978. The conflict dimension is presented in David M. Freeman, JoAnne Tremaine, and Patti Madsen, "Social Well-Being--A Conflict Approach," *Journal of Environmental Management*, Vol. 5 (1977), pp. 319-333.

## 1.3 Problem of Valuation

The problem of measuring social well-being has been complex, intractable and, for the most part, skirted by social scientists. Yet, it is impossible to assess the social well-being impacts associated with policy alternatives without specifying some value criterion. Analysis of social well-being is problematic for several reasons:

1. *Solutions for some groups are problems for others.* To enhance the social well-being of wilderness enthusiasts undercuts the social well-being of snowmobilers, loggers, and others.

2. *Intensity of gains and losses differ between groups.* One management alternative may afford minimal benefits to many people while imparting a large cost to a few. How much pleasure experienced by gainers should it take to balance off the pain experienced by losers? Although marginal economic analysis can suggest something with regard to this problem, there is no known method which can net-out pleasure over pain when all important values are not adequately reflected in the market-


SOCIAL ANALYSIS
SOCIAL
WELL - BEING
dimension
(a)
dimension
(b)
FUTURES
FOREGONE
SOCIAL CONFLICT
POLARIZATION
FINAL REPORT:
integrated
recommendation
on social well-
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of each APD
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physical effects of APD's on PNC's
National Interregional
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(NIMRAS)
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Analysis
Environmental
Analysis
Alternative Program
Directions (APD's)
1
2
3
4
5
Renewable Resources
Planning Act (RPA):
PROGRAM
Renewable Resources
Planning Act (RPA):
ASSESSMENT

Figure 1.2.1
Flow of Analysis

place—as is the case with much natural resource planning.

3. *People change their minds.* Values and associated preferences are not permanent but are fluid and unstable especially under changing circumstances. For example, recreational preferences of individuals and groups can be altered significantly by changing gasoline availability, real income levels, and density of a given area's use. Trying to predict patterns of preference in future decades for social groups in a rapidly changing society is an ambiguous and hazardous exercise subject to much error.

4. *Social well-being cannot be defined by what the majority of affected publics claim to prefer.* Kenneth Arrow has demonstrated that where there are at least two choosing parties and three or more alternatives from which to choose, it is not possible to construct a decision rule which will yield stable results reflecting a population's maximal or optimal welfare.[4] For example, assume that a decision-maker is faced with choosing among three alternative ways of using the land base (alternatives A, B, and C), and it is expected that each alternative will distribute some value differentially among three affected parties (X, Y, and Z below):

Anticipated Payoff to Affected Parties
Under Each Management Alternative

| Management Alternative | Affected Party | | |
|---|---|---|---|
| | X | Y | Z |
| A | 3 | 1 | 2 |
| B | 2 | 3 | 1 |
| C | 1 | 2 | 3 |

---

[4] Kenneth Arrow, *Social Choice and Individual Values.* (Second Ed.) New York: John Wiley and Sons, 1963.

In the situation depicted above, the choice of any one management alternative will result in one affected party receiving the most payoff (value 3), one receiving the second most (value 2), and one receiving the least (value 1). If no side payments are allowed, in which case the affected parties would agree on an alternative and then compensate the loser, there is nothing in the structure of the situation that makes the social well-being mix of one alternative more prefereable to any other. Furthermore, if parties X, Y, and Z are allowed to choose alternatives by a majority vote, we see that selection of a preferred alternative is a function of the order in which pairs of alternatives are compared. For example, if alternatives B and C are compared first, alternative B will be chosen because party X will vote for B (2 is greater than 1), party Y will vote for B (3 is greater than 2), and party Z will cast the only vote for alternative C. After the first comparison is complete, the preferred alternative (in this case B) is compared to the remaining alternative (in this case A). A comparison of A to B shows that parties X and Z will vote for alternative A, while party Y will cast the only vote for alternative B. The result is the selection of alternative A as the overall preferred management alternative. If, on the other hand, the first comparison is that of alternatives A and C, then C will defeat alternative A, and the run-off between alternatives C and B will result in B being chosen, which is a different definition of what the same groups choose as best. For someone seeking to serve social well-being by learning what people prefer and then investing in those management alternatives which serve these preferences, there can be nothing but despair. The same people have rationally chosen two different alternatives as "the best" simply as a function of a change in the order of comparison. Serving majority preferences might be politically wise, but it has no connection with social well-being. What is politically acceptable at any given time, may then undercut social well-being, however defined.

For a variable to be viable in a policy analysis, it must be valuative in nature. In other words, any social well-being variable must consist of the following two components:

(1) *a numerator* stating the existing state of affairs as measured in a given unit of analysis, and;

(2) *a denominator* stating the desirable state of affairs in the unit of analysis from the perspectives of the parties concerned.

$$\frac{\text{Existing level phenomena in unit X}}{\text{Desirable level phenomena in unit X}}$$

If one cannot specify a value judgment for the denominator in a defensible fashion, there is no defensible reason from a policy standpoint for measuring the phenomena. For example, if one wishes to compare the five APD's in terms of their impact on employment, it is necessary to label increased employment as desirable and then compare each proposed APD in terms of that value criterion. In essence, if the value criterion of increasing employment cannot be agreed upon, there is no policy relevant reason for measuring employment. Using the two-component format above, employment appears as:

$$\frac{\text{Existing level of employment}}{\text{Desirable level of employment}}$$

Additionally, two levels of valuation in policy analysis can be identified:

(1) Level one: *a technical level* wherein basic value criteria are formulated in the denominators of impact variables. The analyst specifies value criteria and justifies them.

(2) Level two: *a political/administrative decision-making level* wherein decision-makers make trade-offs among competing value criteria.

In this study we restrict valuation to the level one type. It is left to the authorities to make trade-offs between values built into the social well-being analysis and those built into the other technical and economic analyses.

## 1.4 Definition of Social Well-Being---A Defensible Resolution of the Valuation Problem

Productive and useful analyses of social well-being can be approached by distinguishing between two levels of choice:

(1) *Prescriptive choice* refers to people prescribing choices for themselves and others. It is simply impossible to do a useful and defensible analysis by tapping into individual preference patterns of particular persons, groups, or organizations. There is no known method for determining that dollars spent to produce X board feet of timber as prescribed by logging interests, will generate more net social well-being than the same dollars spent to promote wilderness recreation opportunities. It is at the prescriptive level that one encounters the problems mentioned

in Section 1.3 of this report.

(2) *Context of choice* is the level at which it becomes possible and useful to determine whether a given management alternative will diminish, sustain or expand the array of choice opportunities from which publics may prescribe for themselves their particular and non-commensurable preferences.

Decision-makers are asked to view their land and water resources as setting contexts from which particular preferences can be met. The decision-maker is viewed as a custodian and manager of choice opportunities on the land/water base. Promoting social well-being is equivalent to promoting the context of choice which the planning area can affort for diverse interested publics. To sustain or broaden the context of choice is to serve social well-being.

The operationalization of this social well-being conception is discussed in detail in Chapter Two. Two measureable dimensions of choice context will be employed: (1) futures for choice opportunities foregone, and (2) the extent to which conflict over proposed management alternatives is estimated to be polarized and non-negotiable. In essence, the more a proposed APD foregoes choice opportunities, and the more the conflict over losses are estimated to be polarizing among affected groups, the more the context of choice is diminished and social well-being undercut. That APD which foregoes the fewest futures for key activities and which is least conflict polarizing will be preferred from a social well-being standpoint.

# CHAPTER 2: METHODOLOGICAL LOGIC

## 2.1 Dimensions of Choice Context

Two dimensions are employed to measure whether choice contexts will diminish as a consequence of implementing different management alternatives:

(1) The dimension of *futures foregone*. Social well-being is served when futures for choice opportunities are not foregone, or are foregone as little as possible.

(2) The dimension of *social conflict*. Management alternatives which tend to polarize affected groups undercut social well-being because polarized groups threaten each other and tend to block or undercut each other's choices.

The normative answer, then, as to what enhances social well-being is: (1) any program alternative which cancels out futures for choice opportunities as little as possible and does so where the losses can be most afforded, and; (2) at the same time, reduces the conflict polarization of affected social groups.

## 2.2 Futures Foregone

Futures foregone has to do with what categories of people will lose the opportunity to act out their choices as a result of the implementation of a given APD. The question becomes: Who will be advantaged and who will be disadvantaged if decision-makers choose to implement a particular APD? One key way to help or hurt people is to support or undercut futures for their activities on the land base. We speak of futures being foregone. A foregone future means that implementation of a particular APD will cancel out the future for incompatible activities, thereby undercutting the opportunity to participate in, or "choose," such activities.

In principle, an activity can be any choice opportunity that a PNC is capable of producing or supporting. In this futures foregone analysis the following activity categories were used:

| Activity | Unit of Measurement |
|---|---|
| Wood harvest | cubic feet |
| Domestic livestock grazing | animal unit months |
| Wild ruminant grazing | animal unit months |
| Water yield | acre feet annually |
| Dispersed recreation | recreation visitor days |
| Life form: water | acres capable of sustaining key vertebrates which reproduce in water, on the ground, in bushes or trees respectively |
| Life form: ground | |
| Life form: bushes | |
| Life form: trees | |
| Wilderness | acres |

Each PNC is divided into four ownership categories:

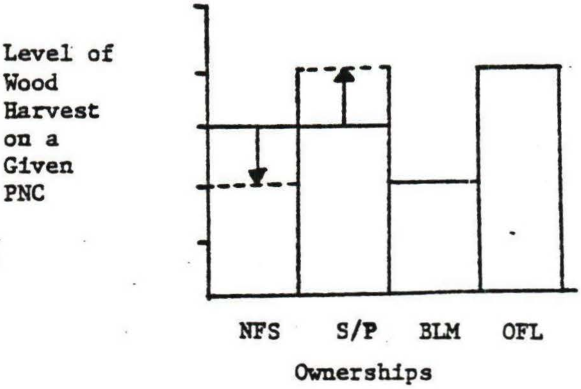
(1) National Forest System (NFS)

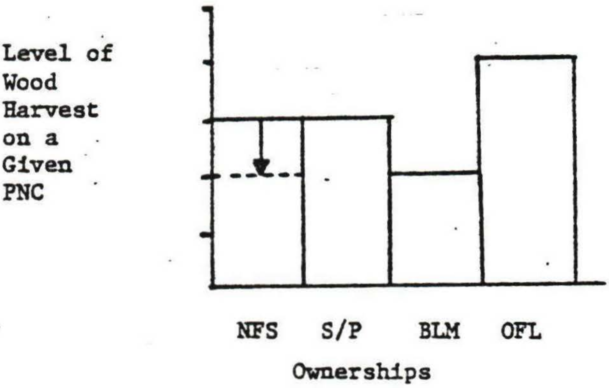
(2) State and Private (S/P)

(3) Bureau of Land Management (BLM)

(4) Other Federal Land (OFL) (e.g., Dept. of Defense, Bureau of Indian Affairs, National Park Service)

Any ownership category can potentially lose, gain, or experience no change with respect to any or all activities. The loss of some portion of an activity on one ownership may constitute a future being foregone. This however, is dependent upon increases and decreases experienced by other ownerships within the PNC. For example: A loss of the activity wood harvest on NFS land would constitute some future being foregone if and only if wood harvest did not experience at least an equivalent increase across other ownerships on the PNC (see below):


NET EFFECT: NO FUTURES FOREGONE
Level of Wood Harvest on a Given PNC
NFS
S/P
BLM
OFL
Ownerships


NET EFFECT: FUTURES FOREGONE
Level of Wood Harvest on a Given PNC
NFS
S/P
BLM
OFL
Ownerships

Operationally, futures foregone scores indicate the proportion of loss of a given activity relative to what remains of that activity on a given PNC. The formula for computing futures foregone scores is as follows:[5]

---

[5] Futures foregone scores have no standardized upper limit across activity categories. This, however, does not present a problem because futures foregone scores are not treated as interval-level data. In the final analysis, futures foregone scores for any given activity and PNC are ranked. Furthermore, since division by zero is mathematically impossible, cases in which the projected year total equals zero are by definition said to be at a maximum futures foregone level. The problem of dividing into zero never arises because some loss of activity must occur for a computation to be made.

$$FF_{ij} = \frac{\text{Base year (1977) total} - \text{Projected year (1990) total}}{\text{Projected year (1990) total}}$$

Where: $i$ = a specific PNC

$j$ = a specific activity

The base year total is the amount of activity ($j$) that existed on PNC ($i$) in the base year (1977). The projected year total is the amount of activity ($j$) that is projected by NIMRAS to exist on PNC ($i$) in the year 1990. Both base year and projected year totals aggregate all land ownerships on a given PNC (see figures 2.2.1 and 2.2.2 for graphic illustrations of futures foregone).

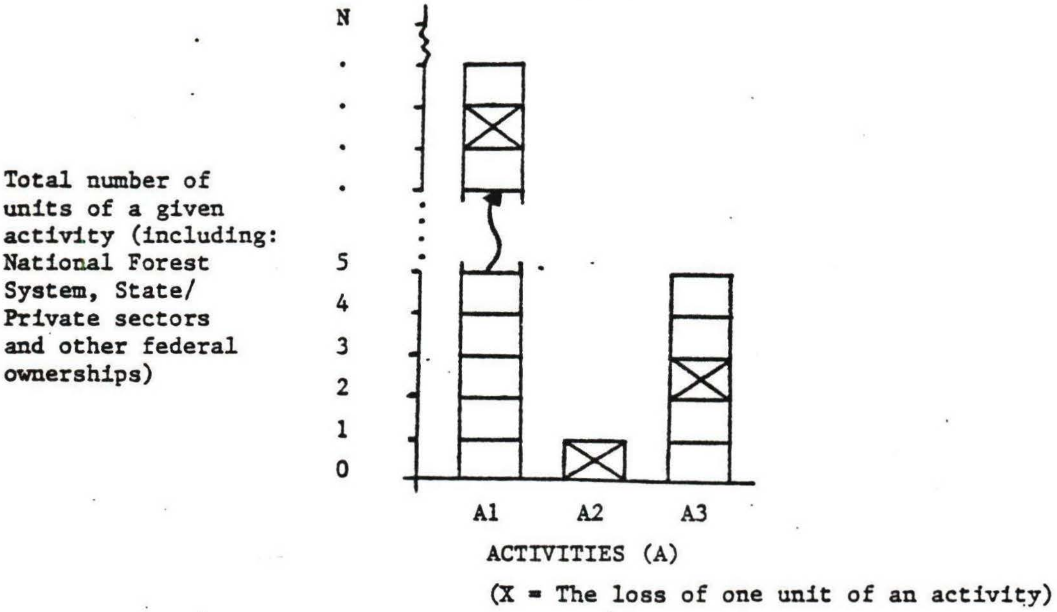
It is important to remember that we are not focusing on how much of an activity was lost in absolute terms. Futures foregone measures the proportion of what remains on all ownerships in a PNC in the projected year to what was available in the base year.

## 2.3 Social Conflict

It is assumed that: (1) there will always be conflict in an area and, (2) there will always be conflict generated by management decisions. The task is to identify the major patterns of conflict operating at the present time within a PNC and the subsequent conflict resulting from each APD if implemented.

There are two patterns of social conflict to be considered: (1) overlapping and, (2) cross-cutting. *Overlapping* or highly polarized conflict structures exist when opponent groups are cleaved apart by differences on all value fronts. Adversaries on one issue are opponents

Graphic Examples of Futures Foregone


N
5
4
3
2
1
0
Total number of units of a given activity (including: National Forest System, State/ Private sectors and other federal ownerships)
A1
A2
A3
ACTIVITIES (A)
(X = The loss of one unit of an activity)

A1 = To lose a future for activity A1 would generate a low futures foregone score because there are many other units remaining to absorb the loss.

A2 = To lose a future for activity A2 would generate the highest futures foregone score because there are no other units available to absorb the loss.

A3 = To lose a future for activity A3 would generate a moderate futures foregone score because there are some units remaining to absorb the loss.

Figure 2.2.1 : Graphic Description of Futures Foregone Logic

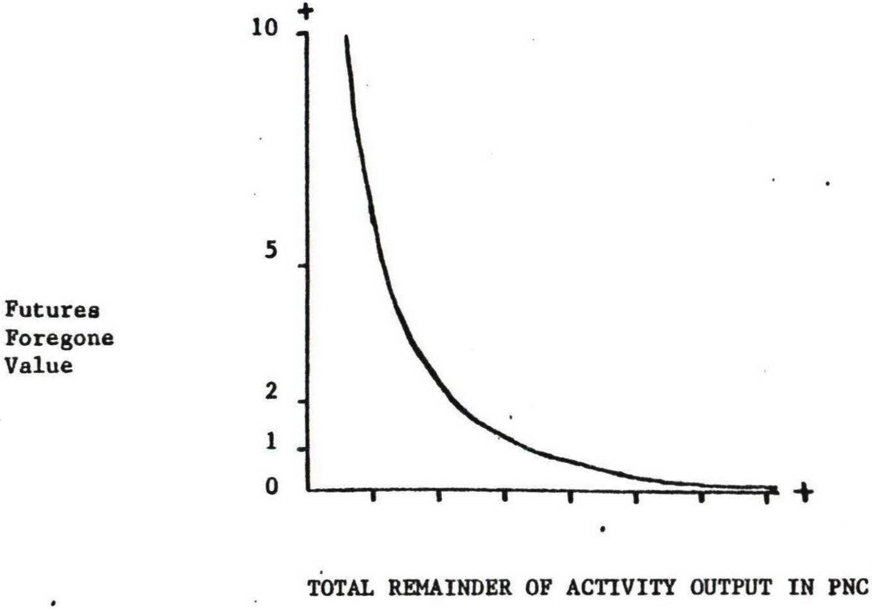


**Figure 2.2.2** Futures Foregone Curve.
Values increase exponentially
as total remainder of activity
on PNC diminishes.

on all. There is no common ground upon which to compromise; no incentive to negotiate. *Cross-cutting* or low polarization conflict structures exist when groups, while opposed or cleaved apart on some issues, are not opposed on all issues. (See Figure 2.3.1.) Highly polarized or overlapping conflict reduces social well-being because groups which oppose each other on issue after issue threaten each other and tend to block or undercut each others choices. Social well-being is served when numerous cross-cutting cleavages can be established across which opposing groups can negotiate. Specifically, our concern is to estimate which APD would cause the least polarization if implemented. If an APD introduces additional highly polarized conflict, its insertion into the web of social life will serve only to increase the probabilities of mutually detrimental conflict.

There is no way, at this time, to estimate how much of an increase in conflict polarization can be absorbed before critical unknown thresholds are exceeded and, as a result, generate significant problems of social cohesion among affected groups. The only responsible recommendation is to avoid increasing levels of conflict polarization if possible.

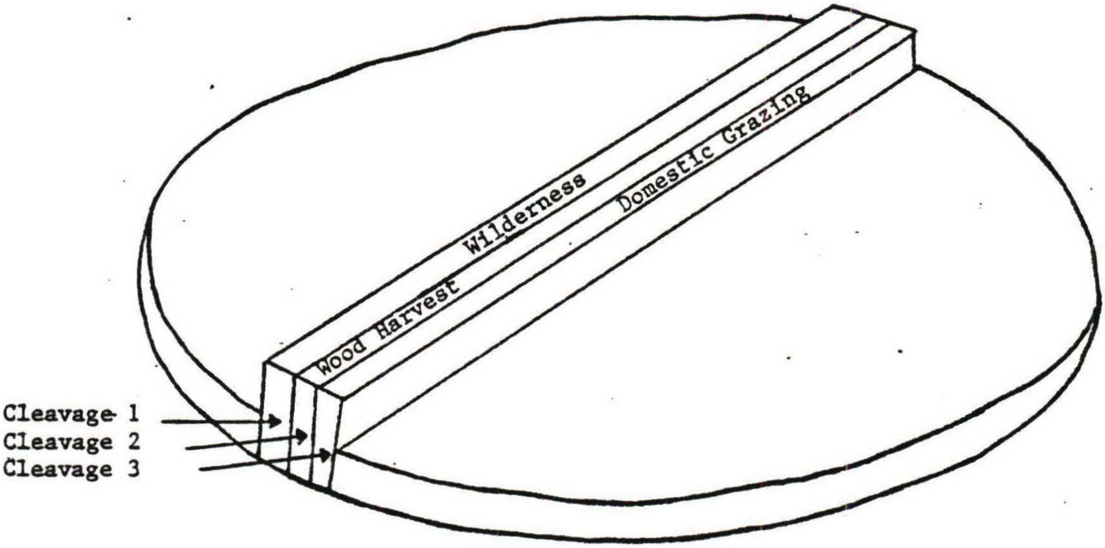
Procedures for computing social conflict polarization scores are best explained when discussing data gathering procedures. Consequently, conflict data gathering procedures and polarization computational procedures are discussed in Section 4.2 of Chapter 4.

## 2.4 Summary

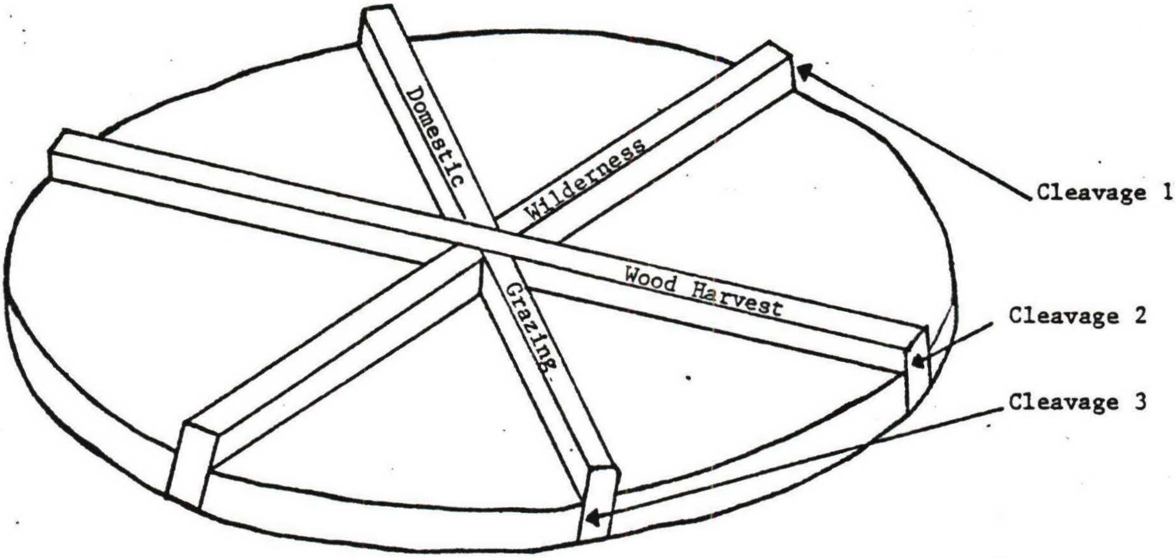
Social well-being is defined in terms of sustaining choice contexts. Therefore, to sustain and/or enlarge the context of choice opportunities

Figure 2.3.1

Patterns of Conflict Cleavages


Wilderness
Domestic Grazing
Wood Harvest
Cleavage 1
Cleavage 2
Cleavage 3

Undesirable Pattern: Overlapping Cleavages
(high polarization)


Domestic
Wilderness
Wood Harvest
Grazing
Cleavage 1
Cleavage 2
Cleavage 3

Desirable Pattern: Cross-Cutting Cleavages
(low polarization)

on the land base for present and future generations is to enhance social well-being. To operationalize the context of choice concept, two dimensions are examined:

1) *Futures Foregone* - How many futures for activities will be lost with what significance as a consequence of implementing the proposed alternative?
2) *Social Conflict Polarization* - Will the conflicts associated with implementation of any given management alternative make for greater or lesser polarization?

Figure 2.4.1 displays the general outline of the context of choice approach to social well-being analysis. One at a time APD's are analyzed with respect to a given PNC. Each analysis begins with the computation of futures foregone scores. If a PNC secures low futures foregone, that PNC passes the futures forgone test and is set aside. If, on the other hand, a PNC secures a high futures foregone score on any one or more of the ten activities by virtue of the projected impact of any APD, that PNC is held out for conflict polarization analysis.

The polarization analysis is important because high levels of polarization lead to high levels of mutual threat among opponents and this leads to the necessity for threatened opponents to employ whatever resources may be at hand to cut down opponent choices. An APD's potential to enhance choice opportunities cannot be realized under conditions of high polarization.

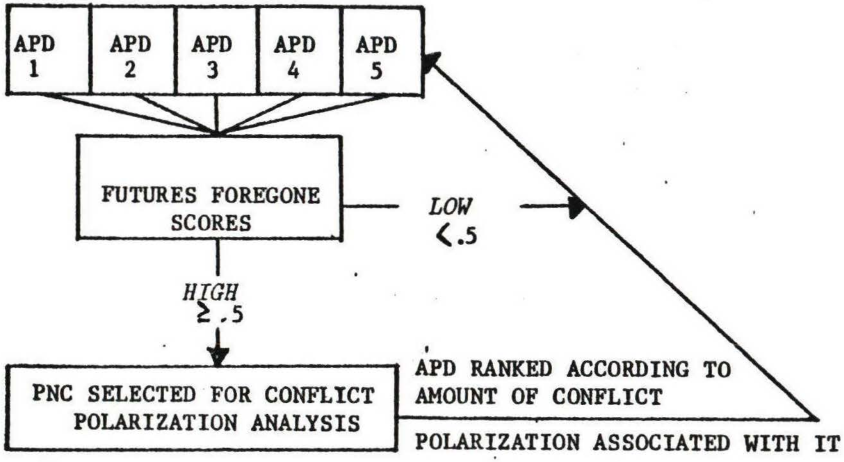

APD 1
APD 2
APD 3
APD 4
APD 5
FUTURES FOREGONE SCORES
LOW
< .5
HIGH
≥ .5
PNC SELECTED FOR CONFLICT POLARIZATION ANALYSIS
APD RANKED ACCORDING TO AMOUNT OF CONFLICT
POLARIZATION ASSOCIATED WITH IT

Figure 2.4.1

General Outline of the Context of Choice Approach to Social Well-Being Analysis

# CHAPTER 3: ANALYSIS OF FUTURES FOREGONE

## 3.1 Overview

In this chapter, the futures foregone associated with the implementation of each of the five proposed alternative program directions are analyzed. Section 3.2 presents the futures foregone data by activity for the 106 PNCs. Section 3.3 synthesizes the particular activity impacts and draws over-all conclusions about the APD futures foregone ranking.

## 3.2 Futures Foregone Analysis

As noted earlier, futures foregone represents one of two dimensions of social well-being and refers to the degree to which a choice opportunity, if lost through the implementation of a given alternative, will be missed—i.e., the significance of loss. Operationally, futures foregone scores indicate the proportion of loss of a given activity relative to the capacity of all land ownership categories to provide the same activity. Futures foregone scores[1] for the nine activities as impacted by the five APDs are reported in Tables 3.1-3.9.[2] These tables also present the PNC futures foregone scores ranked across, and summed under, the five APDs; and the five APDs ranked vis-a-vis each other on the basis of the summed rank scores. The reader, in interpreting Tables 3.1-3.9 will find it helpful to:

1) examine PNC rows across APDs with a view to seeing which APDs

---

[1] A futures foregone score of less than .01 was considered to be a trivial departure from the present (1977) condition.

[2] No futures foregone scores will be reported for the tenth activity—wilderness—because no APD reduced wilderness acreage in the NIMRAS model. However, increases in wilderness acreage could be a source of conflict and, as such, wilderness is addressed in the conflict polarization analysis.

secured what futures foregone (FF) scores on the particular PNC.

2) compare the raw FF scores across APDs, for a given PNC, noting that the appropriate rank has been assigned to each APD relative to each other APD's raw score.

3) note that blank cells in the table indicate that there were no FF for that activity generated by a particular APD on the PNC. In effect, the more blanks, the less the ranks, and the lower the sum of ranks for a given APD.

4) examine the sum of ranks earned by each APD noting that the lower the rank, the lower the FF score relative to other APD FF scores, therefore the lower the sum of rank scores. This is the most desirable APD from a futures foregone standpoint.[3]

A combination of results across all 9 activities is presented in Table 3.10.

### 3.2.1 Wood Harvest (Table 3.1)

Ranking the APDs on the basis of the summed rank scores, we see that the APDs range from low to high futures foregone as follows: APD 5

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[3] The APD raw scores and rankings for each activity are presented in full so that the interested reader can compute the regional rankings of APDs. The regional breakdowns are not presented in this report because to do so would necessitate approximately an additional 190 pages to be added to this chapter. However, the number following the hyphen in the PNC column indicates the RPA region within which the PNC unit is located. It is therefore possible for one to arrive at APD sums of ranks for all PNCs for any specific RPA region for any or all of the nine activities if so desired.

(summed rank score = 23), APD 2 (26), APD 3 (27), APD 1 (29), and APD 4 (35). Thus, in the case of wood harvest, the preferred APD from a futures foregone standpoint is APD 5, followed in descending order by APDs 2, 3, 1, and 4.

### 3.2.2 Domestic Grazing (Table 3.2)

Based on the summed rank scores, the APDs are ordered from low to high futures foregone, therefore in order of preference, as follows: APD 2 (summed rank score = 19), APD 3 (22), APD 5 (23), APD 1 (27), and APD 4 (32).

### 3.2.3 Wild Ruminant Grazing (Table 3.3)

The APDs are ranked from low to high futures foregone, therefore in order of preference, as follows: APD 5 (summed rank score = 54), APD 1 (56), APD 3 (57), APD 2 (58), and APD 4 (66).

### 3.2.4 Water Yield (Table 3.4)

The APDs are ranked from low to high futures foregone, therefore in order of preference, as follows: APD 3 (summed rank score = 61), APD 5 (62), APD 2 (66), APD 1 (73), and APD 4 (74).

### 3.2.5 Dispersed Recreation (Table 3.5)

Ordering the APD by the summed rank values, therefore in order of futures foregone preference, we find the following pattern of increasing futures foregone scores: APD 5 (summed rank score = 24), APD 3 (26), APD 2 (29), and APD 1 (30) tied with APD 4 (30).

### 3.2.6 Life Form Water (Table 3.6)

Ordering the alternatives from low to high futures foregone on the basis of the summed rank scores and therefore by futures foregone preference, we find the following ranking of alternatives: APD 1 (summed rank score = 88), APD 3 (92), APD 2 (93), APD 5 (99), and APD 4 (105).

### 3.2.7 Life Form Ground (Table 3.7)

If we rank each of the APDs on the basis of the summed rank scores, we find the ordering of most to least preferable APDs in terms of futures foregone to be : APD 1 (summed rank score = 58), APD 3 (62), APD 5 (66), APD 2 (78), and APD 4 (81).

### 3.2.8 Life Form Bushes (Table 3.8)

On the basis of the summed rank scores, we can arrange the five APDs on a continuum of most to least preferable in terms of futures foregone as follows: APD 3 (summed rank score = 69), APD 5 (70), APD 1 (71), APD 2 (75), and APD 4 (78).

### 3.2.9 Life Form Trees (Table 3.9)

Ranking the alternatives on the basis of the summed rank scores, we find the following ordering of most to least preferable APDs in futures foregone terms: APD 2 (summed rank score = 81), APD 5 (84), APD 3 (85), APD 1 (88), and APD 4 (90).

### 3.2.10 Futures Foregone Analysis Combining Nine Activities (Table 3.10)

The overall meaning of each APD is not to be found in any specific activity rankings (e.g., wood harvest, domestic grazing) such as have been presented in the foregoing sections, but is found in the combination of each APD's nine activities in its own unique configuration of losses. It is now possible to combine all the separate effects of each APD on all PNCs across all nine activities to determine which APD foregoes the fewest futures for choice opportunities on an over-all basis. It is on this over-all basis, combining the impacts of all 9 activities, that the final futures foregone APD rankings are constructed. APD 3 virtually ties with APD 5 for the first rank position given that the difference between APD 3 (501) and APD 5 (505) is only four units. The same might be said for APD's 1 (520) and 2 (525) which are virtually tied for second place—their difference being only 5 units. It is quite clear that APD 4 (591) is the least preferable by a substantial margin.

Table 3.1 Futures Foregone Scores and Ranking of APDs by PNCs for Wood Harvest

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 72-5 | .01 | 1 | | | | | | | | |
| 15-5 | .02 | 2 | .02 | 2 | .02 | 2 | .01 | 1 | | |
| 92-2 | .04 | 2 | | | .01 | 1 | | | | |
| 14-5 | .05 | 1 | | | | | .17 | 2 | | |
| 89-4 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 |
| 95-4 | .09 | 2 | .01 | 1 | .12 | 3 | .01 | 1 | .12 | 3 |
| 2-7 | .09 | 3 | .09 | 3 | .01 | 1 | .10 | 4 | .06 | 2 |
| 4-6 | .13 | 4 | .06 | 2 | .07 | 3 | .15 | 5 | .01 | 1 |
| 94-3 | .14 | 3 | .24 | 4 | .01 | 1 | .32 | 5 | .10 | 2 |
| 105-3 | .82 | 1 | 1.33 | 4 | .89 | 2 | 1.33 | 4 | .92 | 3 |
| 92-1 | .89 | 4 | .75 | 2 | .84 | 3 | .74 | 1 | .84 | 3 |
| 88-3 | .89 | 2 | .64 | 1 | .91 | 3 | .64 | 1 | .91 | 3 |
| 14-6 | 1.63 | 3 | | | 1.57 | 2 | 2.23 | 4 | .10 | 1 |
| 94-4 | | | .01 | 1 | .01 | 1 | .01 | 1 | | |
| 13-5 | | | | | | | | | .03 | 1 |
| 5-7 | | | | | .01 | 1 | | | .03 | 2 |
| 93-4 | | | .05 | 1 | .05 | 1 | .05 | 1 | | |
| 97-4 | | | .18 | 1 | | | .18 | 1 | | |
| 88-4 | | | .20 | 3 | .03 | 2 | .20 | 3 | .01 | 1 |
| Sum of Ranks | | 29 | | 26 | | 27 | | 35 | | 23 |
| Rank Order of APDs | | 4 | | 2 | | 3 | | 5 | | 1 |

Table 3.2 Futures Foregone Scores and Ranking of APDs by PNCs for Domestic Grazing

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 44-5 | .01 | 1 | | | | | .03 | 2 | | |
| 54-4 | .05 | 3 | .03 | 1 | .05 | 3 | .04 | 2 | .05 | 3 |
| 4-6 | .09 | 1 | .12 | 3 | | | .10 | 2 | | |
| 55-4 | .10 | 2 | .09 | 1 | .09 | 1 | .09 | 1 | .09 | 1 |
| 2-7 | .10 | 2 | .10 | 2 | | | .10 | 2 | .06 | 1 |
| 70-4 | .12 | 1 | .12 | 1 | .12 | 1 | .12 | 1 | .12 | 1 |
| 81-3 | .14 | 2 | .11 | 1 | .14 | 2 | .11 | 1 | .14 | 2 |
| 15-5 | .14 | 2 | .01 | 1 | | | .25 | 3 | | |
| 45-6 | .19 | 2 | | | .12 | 1 | .19 | 2 | | |
| 94-4 | .25 | 1 | .25 | 1 | .25 | 1 | .25 | 1 | .25 | 1 |
| 80-4 | .36 | 2 | .02 | 1 | .36 | 2 | | | .36 | 2 |
| 45-5 | .48 | 4 | .07 | 1 | .32 | 2 | .48 | 4 | .44 | 3 |
| 14-6 | 1.88 | 4 | | | 1.39 | 2 | 1.85 | 3 | .10 | 1 |
| 45-7 | | | | | 8.50 | 2 | | | .19 | 1 |
| 7-7 | | | .19 | 1 | | | .37 | 2 | | |
| 88-3 | | | .20 | 2 | .01 | 1 | .20 | 2 | .01 | 1 |
| 88-4 | | | .40 | 3 | .10 | 2 | .40 | 3 | .05 | 1 |
| 43-6 | | | | | .03 | 1 | | | .05 | 2 |
| 5-7 | | | | | .08 | 1 | | | .09 | 2 |
| 75-4 | | | | | | | .01 | 1 | | |
| 107-6 | | | | | | | | | .45 | 1 |
| Sum of Ranks | | 27 | | 19 | | 22 | | 32 | | 23 |
| Rank Order of ADPs | | 4 | | 1 | | 2 | | 5 | | 3 |

Table 3.3 Futures Foregone Scores and Ranking of APDs by PNCs for Wild Ruminant Grazing

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 91-2 | .01 | 1 | .01 | 1 | | | .01 | 1 | | |
| 82-3 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 56-5 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 45-5 | | | .01 | 1 | | | | | | |
| 34-7 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 32-5 | | | .01 | 1 | | | | | .01 | 1 |
| 15-5 | | | .01 | 1 | .01 | 1 | | | | |
| 14-5 | .03 | 2 | .01 | 1 | .05 | 3 | .23 | 5 | .11 | 4 |
| 3-4 | | | .01 | 1 | .01 | 1 | | | | |
| 102-4 | .01 | 1 | .01 | 1 | .02 | 2 | .02 | 2 | .02 | 2 |
| 93-4 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 51-5 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 46-5 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 21-7 | .01 | 1 | .04 | 3 | .01 | 1 | .03 | 2 | .01 | 1 |
| 4-6 | .07 | 4 | .04 | 2 | .05 | 3 | .08 | 5 | .02 | 1 |
| 1-6 | | | .04 | 2 | | | .01 | 1 | | |
| 73-4 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 |
| 58-5 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 |
| 21-5 | .04 | 1 | .05 | 2 | .04 | 1 | .04 | 1 | .04 | 1 |
| 89-2 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 |
| 49-7 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 |
| 32-7 | | | .06 | 3 | .04 | 2 | .10 | 4 | .03 | 1 |

Table 3.3 (Continued)

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 23-5 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 |
| 17-5 | .01 | 1 | .08 | 3 | | | .08 | 3 | .02 | 2 |
| 106-3 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 |
| 2-7 | .07 | 3 | .09 | 4 | .01 | 1 | .07 | 3 | .04 | 2 |
| 81-3 | .09 | 1 | .10 | 2 | .09 | 1 | .10 | 2 | .09 | 1 |
| 62-5 | .11 | 2 | .10 | 1 | .11 | 2 | .10 | 1 | .10 | 1 |
| 91-4 | .12 | 1 | .12 | 1 | .12 | 1 | .12 | 1 | .12 | 1 |
| 31-5 | .12 | 1 | .12 | 1 | .12 | 1 | .12 | 1 | .12 | 1 |
| [illegible]4-5 | .13 | 1 | .13 | 1 | .13 | 1 | .13 | 1 | .13 | 1 |
| [illegible]8-3 | .15 | 1 | .15 | 1 | .15 | 1 | .15 | 1 | .15 | 1 |
| 48-4 | .17 | 1 | .17 | 1 | .17 | 1 | .17 | 1 | .17 | 1 |
| 33-5 | .17 | 1 | .17 | 1 | .17 | 1 | .17 | 1 | .17 | 1 |
| 63-5 | .18 | 1 | .18 | 1 | .18 | 1 | .18 | 1 | .18 | 1 |
| 52-5 | .29 | 1 | .29 | 1 | .29 | 1 | .29 | 1 | .29 | 1 |
| 74-4 | .32 | 1 | .32 | 1 | .32 | 1 | .32 | 1 | .32 | 1 |
| 28-5 | .36 | 1 | .36 | 1 | .36 | 1 | .36 | 1 | .36 | 1 |
| 49-6 | 1.06 | 1 | 1.06 | 1 | 1.06 | 1 | 1.06 | 1 | 1.06 | 1 |
| 105-3 | .51 | 1 | 1.12 | 4 | .66 | 2 | 1.12 | 4 | .71 | 3 |
| 48-5 | 2.45 | 1 | 2.45 | 1 | 2.45 | 1 | 2.45 | 1 | 2.45 | 1 |
| 47-5 | 2.75 | 1 | 2.75 | 1 | 2.75 | 1 | 2.75 | 1 | 2.75 | 1 |
| 13-6 | .01 | 1 | | | .01 | 1 | | | .01 | 1 |
| 101-3 | .01 | 1 | | | | | | | | |

Table 3.3 (Continued)

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 3-6 | .01 | 1 | | | .01 | 1 | | | .01 | 1 |
| 95-4 | .03 | 1 | | | .03 | 1 | | | .03 | 1 |
| 61-5 | .04 | 1 | | | .04 | 1 | .04 | 1 | .04 | 1 |
| 49-5 | .08 | 4 | | | .05 | 3 | .01 | 1 | .04 | 2 |
| 10-7 | .17 | 1 | | | | | | | | |
| 14-6 | 1.21 | 3 | | | 1.14 | 2 | 1.48 | 4 | .09 | 1 |
| 86-2 | | | | | .01 | 1 | | | | |
| 13-5 | | | | | .01 | 1 | .01 | 1 | .01 | 1 |
| 5-7 | | | | | .02 | 1 | | | .02 | 1 |
| Sum of Ranks | | 56 | | 58 | | 57 | | 66 | | 54 |
| Rank Order of APDs | | 2 | | 4 | | 3 | | 5 | | 1 |

Table 3.4 Futures Foregone Scores and Ranking of APDs by PNCs for Water Yield

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 94-4 | .01 | 1 | | | | | | | .01 | 1 |
| 73-4 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 56-5 | .01 | 1 | | | .01 | 1 | .01 | 1 | | |
| 47-5 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 21-7 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 17-5 | .01 | 1 | .07 | 2 | | | .07 | 2 | .01 | 1 |
| 101-2 | .01 | 1 | | | | | | | | |
| 13-6 | .02 | 1 | | | .02 | 1 | | | .02 | 1 |
| 11-5 | .02 | 1 | | | | | | | | |
| 48-5 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 |
| 2-7 | .03 | 2 | .04 | 3 | | | .03 | 2 | .02 | 1 |
| 13-5 | .04 | 2 | .01 | 1 | | | .01 | 1 | | |
| 103-3 | .04 | 2 | .04 | 2 | .03 | 1 | .04 | 2 | .03 | 1 |
| 4-6 | .04 | 1 | | | | | .04 | 1 | | |
| 84-2 | .05 | 1 | .08 | 3 | .06 | 2 | .08 | 3 | .06 | 2 |
| 93-4 | .06 | 1 | .07 | 2 | .07 | 2 | .07 | 2 | .06 | 1 |
| 72-5 | .06 | 1 | | | | | | | | |
| 14-6 | .06 | 3 | | | .03 | 2 | .03 | 2 | .01 | 1 |
| 23-5 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 |
| 101-3 | .08 | 3 | .07 | 2 | .10 | 4 | .06 | 1 | .11 | 5 |
| 95-3 | .09 | 1 | .10 | 2 | .09 | 1 | .10 | 2 | .09 | 1 |

Table 3.4 (Continued)

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 66-2 | .10 | 1 | .10 | 1 | .10 | 1 | .10 | 1 | .10 | 1 |
| 15-5 | .10 | 2 | | | | | .09 | 1 | | |
| 12-5 | .11 | 2 | .04 | 1 | .18 | 3 | .11 | 2 | .28 | 4 |
| 76-4 | .12 | 1 | .12 | 1 | .12 | 1 | .12 | 1 | .12 | 1 |
| 41-7 | .13 | 1 | .13 | 1 | .13 | 1 | .13 | 1 | .13 | 1 |
| 21-5 | .13 | 2 | .13 | 2 | .11 | 1 | .14 | 3 | .11 | 1 |
| 10-7 | .13 | 1 | | | | | | | | |
| 87-2 | .14 | 1 | .14 | 1 | .14 | 1 | .14 | 1 | .14 | 1 |
| 88-4 | .16 | 1 | | | | | | | | |
| 91-5 | .20 | 1 | .99 | 2 | 1.13 | 3 | .99 | 2 | .99 | 2 |
| 73-5 | .21 | 1 | .68 | 4 | .58 | 3 | .68 | 4 | .47 | 2 |
| 60-5 | .22 | 1 | .25 | 2 | .22 | 1 | .25 | 2 | .25 | 2 |
| 12-6 | .23 | 2 | .01 | 1 | .26 | 3 | .01 | 1 | .23 | 2 |
| 40-7 | .25 | 1 | .25 | 1 | .25 | 1 | .25 | 1 | .25 | 1 |
| 80-4 | .26 | 1 | .26 | 1 | .26 | 1 | .32 | 2 | .26 | 1 |
| 91-4 | .27 | 1 | .28 | 2 | .28 | 2 | .28 | 2 | .28 | 2 |
| 16-5 | .27 | 5 | .05 | 2 | .10 | 3 | .03 | 1 | .12 | 4 |
| 101-4 | .28 | 3 | .21 | 1 | .28 | 3 | .23 | 2 | .28 | 3 |
| 102-4 | .31 | 2 | .31 | 2 | .30 | 1 | .30 | 1 | .30 | 1 |
| 66-4 | .33 | 3 | .30 | 1 | .30 | 1 | .30 | 1 | .32 | 2 |
| 30-7 | .36 | 1 | .55 | 2 | .36 | 1 | .55 | 2 | .36 | 1 |
| 94-3 | .38 | 1 | .38 | 1 | .38 | 1 | .40 | 2 | .38 | 1 |

Table 3.4 (Continued)

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 67-5 | .43 | 1 | .43 | 1 | .43 | 1 | .43 | 1 | .43 | 1 |
| 58-5 | .52 | 3 | .51 | 2 | .52 | 3 | .52 | 3 | .50 | 1 |
| 102-3 | .64 | 2 | .66 | 3 | .61 | 1 | .67 | 4 | .61 | 1 |
| 63-5 | .72 | 1 | .72 | 1 | .72 | 1 | .72 | 1 | .72 | 1 |
| 66-5 | .92 | 1 | .97 | 2 | .92 | 1 | .92 | 1 | .92 | 1 |
| 62-5 | 2.41 | 2 | 2.40 | 1 | 2.41 | 2 | 2.41 | 2 | 2.41 | 2 |
| 10-5 | | | .01 | 1 | | | .05 | 2 | | |
| 104-3 | | | .01 | 1 | | | .01 | 1 | | |
| 61-5 | | | .02 | 1 | | | | | | |
| 3-6 | | | .06 | 1 | | | .06 | 1 | | |
| 97-4 | | | .09 | 1 | | | .09 | 1 | | |
| 5-7 | | | | | .01 | 1 | | | .01 | 1 |
| 107-6 | | | | | | | | | .06 | 1 |
| Sum of Ranks | | 73 | | 66 | | 61 | | 74 | | 62 |
| Rank Order of APDs | | 4 | | 3 | | 1 | | 5 | | 2 |

Table 3.5 Futures Foregone Scores and Ranking of APDs by PNCs for Dispersed Recreation

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 88-3 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 67-5 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 61-5 | .01 | 1 | | | .01 | 1 | .01 | 1 | .01 | 1 |
| 58-4 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 50-5 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 15-5 | .01 | 1 | | | | | .01 | 1 | | |
| 4-6 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | | |
| 54-4 | .02 | 1 | .03 | 2 | .02 | 1 | .02 | 1 | .02 | 1 |
| 45-5 | .02 | 2 | | | .01 | 1 | .02 | 2 | .02 | 2 |
| 40-7 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 14-6 | .02 | 1 | | | .02 | 1 | .02 | 1 | | |
| 1-6 | .02 | 2 | .01 | 1 | .01 | 1 | | | | |
| 58-5 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 |
| 46-5 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 |
| 105-3 | .03 | 1 | .04 | 2 | .03 | 1 | .04 | 2 | .03 | 1 |
| 1-7 | .03 | 1 | | | .03 | 1 | | | .03 | 1 |
| 41-7 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 |
| 66-2 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 |
| 47-5 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 |
| 97-3 | .07 | 1 | .07 | 1 | .07 | 1 | .07 | 1 | .07 | 1 |
| 60-5 | .11 | 1 | .12 | 2 | .11 | 1 | .11 | 1 | .11 | 1 |
| 23-5 | .12 | 1 | .12 | 1 | .12 | 1 | .12 | 1 | .12 | 1 |

Table 3.5 (Continued)

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 66-4 | .15 | 2 | .14 | 1 | .14 | 1 | .14 | 1 | .14 | 1 |
| 63-5 | .24 | 1 | .24 | 1 | .24 | 1 | .24 | 1 | .24 | 1 |
| 77-4 | .26 | 1 | .26 | 1 | .26 | 1 | .26 | 1 | .26 | 1 |
| 59-5 | .27 | 1 | .27 | 1 | .27 | 1 | .27 | 1 | .27 | 1 |
| 66-5 | .45 | 1 | .49 | 2 | .45 | 1 | .45 | 1 | .45 | 1 |
| 88-4 | | | .01 | 1 | | | .01 | 1 | | |
| 10-7 | | | .01 | 1 | | | .01 | 1 | | |
| 2-7 | | | .01 | 1 | | | .01 | 1 | | |
| Sum of Ranks | | 30 | | 29 | | 26 | | 30 | | 24 |
| Rank Order of APDs | | 4 | | 3 | | 2 | | 4 | | 1 |

Table 3.6 Futures Foregone Scores and Ranking of APDs by PNCs for Life Form Water

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 97-2 | .01 | 1 | | | .01 | 1 | | | .01 | 1 |
| 97-1 | .01 | 1 | | | .01 | 1 | | | .01 | 1 |
| 91-5 | .01 | 1 | .01 | 1 | .03 | 2 | .04 | 3 | .04 | 3 |
| 88-1 | .01 | 1 | | | .01 | 1 | | | .01 | 1 |
| 73-5 | .01 | 1 | .01 | 1 | .03 | 2 | .04 | 3 | .04 | 3 |
| 73-4 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 57-5 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 49-7 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 49-5 | .01 | 1 | | | | | | | | |
| 44-6 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 34-4 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 32-5 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 107-6 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | | |
| 104-3 | .01 | 1 | .02 | 2 | | | .02 | 2 | .01 | 1 |
| 101-4 | .01 | 1 | | | .01 | 1 | .01 | 1 | .01 | 1 |
| 2-6 | .01 | 1 | .01 | 1 | .02 | 2 | .02 | 2 | .02 | 2 |
| 1-6 | .01 | 1 | | | | | | | | |
| 93-4 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 90-2 | .02 | 2 | .01 | 1 | .03 | 3 | .01 | 1 | .03 | 3 |
| 88-3 | .02 | 2 | .01 | 1 | .02 | 2 | .01 | 1 | .02 | 2 |
| 86-2 | .02 | 2 | | | .01 | 1 | | | .01 | 1 |

Table 3.6 (Continued)

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 51-5 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 50-5 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 48-4 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 30-7 | .02 | 1 | .08 | 2 | .02 | 1 | .08 | 2 | .02 | 1 |
| 21-7 | .02 | 1 | .05 | 4 | .03 | 2 | .04 | 3 | .03 | 2 |
| 21-6 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 13-6 | .02 | 1 | | | .02 | 1 | | | .02 | 1 |
| 1-7 | .02 | 1 | | | .02 | 1 | | | .02 | 1 |
| 89-2 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 |
| 74-4 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 |
| 56-5 | .03 | 2 | .01 | 1 | .03 | 2 | .03 | 2 | .03 | 2 |
| 34-6 | .03 | 1 | .04 | 2 | .03 | 1 | .03 | 1 | .03 | 1 |
| 13-5 | .03 | 3 | .02 | 2 | .01 | 1 | .04 | 4 | .03 | 3 |
| 11-6 | .03 | 1 | .04 | 2 | .03 | 1 | .04 | 2 | | |
| 11-5 | .03 | 2 | .04 | 3 | .02 | 1 | .05 | 4 | .03 | 2 |
| 92-2 | .04 | 1 | .05 | 2 | .04 | 1 | .05 | 2 | .04 | 1 |
| 58-4 | .04 | 2 | .04 | 2 | .04 | 2 | .03 | 1 | .04 | 2 |
| 41-7 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 |
| 10-7 | .04 | 1 | .04 | 1 | | | .04 | 1 | | |
| 102-4 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 |
| 67-5 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 |
| 21-5 | .05 | 1 | .06 | 2 | .05 | 1 | .05 | 1 | .05 | 1 |

Table 3.6 (Continued)

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 14-5 | .05 | 2 | .01 | 1 | .06 | 3 | .01 | 1 | .05 | 2 |
| 42-7 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 |
| 40-7 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 |
| 12-5 | .06 | 1 | .07 | 2 | .09 | 3 | .09 | 3 | .11 | 4 |
| 52-5 | .07 | 1 | .07 | 1 | .07 | 1 | .07 | 1 | .07 | 1 |
| 91-4 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 |
| 34-5 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 |
| 12-6 | .08 | 2 | .02 | 1 | .09 | 3 | .02 | 1 | .08 | 2 |
| 92-4 | .09 | 1 | .09 | 1 | .09 | 1 | .09 | 1 | .09 | 1 |
| 102-3 | .09 | 1 | .09 | 1 | .09 | 1 | .09 | 1 | .09 | 1 |
| 92-1 | .11 | 1 | .11 | 1 | .11 | 1 | .11 | 1 | .11 | 1 |
| 80-4 | .11 | 2 | .11 | 2 | .11 | 2 | .11 | 2 | .10 | 1 |
| 23-5 | .11 | 1 | .11 | 1 | .11 | 1 | .11 | 1 | .11 | 1 |
| 31-5 | .12 | 1 | .12 | 1 | .12 | 1 | .12 | 1 | .12 | 1 |
| 19-5 | .12 | 3 | .03 | 1 | .16 | 5 | .06 | 2 | .14 | 4 |
| 92-3 | .13 | 1 | .13 | 1 | .13 | 1 | .13 | 1 | .13 | 1 |
| 63-5 | .16 | 1 | .16 | 1 | .16 | 1 | .16 | 1 | .16 | 1 |
| 59-5 | .16 | 1 | .16 | 1 | .16 | 1 | .16 | 1 | .16 | 1 |
| 62-5 | .18 | 1 | .24 | 3 | .20 | 1 | .23 | 2 | .23 | 2 |
| 62-4 | .19 | 1 | .19 | 1 | .19 | 1 | .19 | 1 | .19 | 1 |
| 58-5 | .21 | 1 | .21 | 1 | .21 | 1 | .21 | 1 | .21 | 1 |
| 16-5 | .26 | 5 | .13 | 2 | .12 | 1 | .24 | 4 | .21 | 3 |

Table 3.6 (Continued)

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 48-5 | .32 | 1 | .32 | 1 | .32 | 1 | .32 | 1 | .32 | 1 |
| 60-5 | .33 | 1 | .39 | 2 | .33 | 1 | .39 | 2 | .39 | 2 |
| 61-5 | .34 | 2 | .01 | 1 | .39 | 3 | .34 | 2 | .39 | 3 |
| 49-6 | .40 | 1 | .40 | 1 | .40 | 1 | .40 | 1 | .40 | 1 |
| 47-5 | .53 | 1 | .53 | 1 | .53 | 1 | .53 | 1 | .53 | 1 |
| 25-7 | | | .01 | 1 | | | .01 | 1 | | |
| 5-7 | | | .01 | 1 | | | .01 | 1 | | |
| 4-6 | | | .01 | 1 | | | | | .01 | 1 |
| 32-7 | | | .02 | 2 | .01 | 1 | .03 | 3 | .01 | 1 |
| 17-5 | | | .03 | 2 | | | .03 | 2 | .01 | 1 |
| 10-5 | | | .03 | 1 | | | .04 | 2 | | |
| 3-6 | | | .03 | 1 | | | .03 | 1 | | |
| 7-7 | | | .05 | 2 | | | .07 | 3 | .02 | 1 |
| 72-5 | | | .06 | 2 | .03 | 1 | .06 | 2 | .06 | 2 |
| 35-7 | | | | | .01 | 1 | | | | |
| 36-7 | | | | | .02 | 1 | | | | |
| Sum of Ranks | | 88 | | 93 | | 92 | | 105 | | 99 |
| Rank Order of APDs | | 1 | | 3 | | 2 | | 5 | | 4 |

Table 3.7 Futures Foregone Scores and Ranking of APDs by PNCs for Life Form Ground

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 51-5 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 49-7 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 34-7 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 3-6 | .01 | 1 | | | .01 | 1 | | | .01 | 1 |
| 52-5 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 48-4 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 46-5 | .02 | 2 | .01 | 1 | .02 | 2 | .02 | 2 | .02 | 2 |
| 14-5 | .02 | 1 | .04 | 2 | .04 | 2 | .04 | 2 | .04 | 2 |
| 76-4 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 |
| 67-5 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 |
| 62-4 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 |
| 54-4 | .03 | 1 | .04 | 2 | .03 | 1 | .04 | 2 | .03 | 1 |
| 107-7 | .03 | 2 | .02 | 1 | .04 | 3 | .02 | 1 | .03 | 2 |
| 34-6 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 |
| 4-6 | .04 | 2 | | | | | .03 | 1 | | |
| 66-4 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 |
| 59-5 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 |
| 30-7 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 |
| 101-2 | .05 | 3 | .03 | 2 | .02 | 1 | .03 | 2 | .03 | 2 |
| 63-5 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 |
| 106-3 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 |
| 89-5 | .07 | 1 | 3.73 | 3 | .72 | 2 | 3.73 | 3 | 3.73 | 3 |

Table 3.7 (Continued)

| | 1 | | 2 | | 3 | | 4 | | 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 56-5 | .07 | 2 | .05 | 1 | .07 | 2 | .07 | 2 | .07 | 2 |
| 41-7 | .07 | 1 | .07 | 1 | .07 | 1 | .07 | 1 | .07 | 1 |
| 31-5 | .07 | 1 | .07 | 1 | .07 | 1 | .07 | 1 | .07 | 1 |
| 34-4 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 |
| 14-6 | .08 | 2 | | | .08 | 2 | .09 | 3 | .01 | 1 |
| 2-7 | .08 | 2 | .11 | 4 | | | .09 | 3 | .05 | 1 |
| 23-5 | .09 | 1 | .09 | 1 | .09 | 1 | .09 | 1 | .09 | 1 |
| 58-4 | .10 | 1 | .10 | 1 | .10 | 1 | .10 | 1 | .10 | 1 |
| 68-4 | .11 | 1 | .11 | 1 | .11 | 1 | .11 | 1 | .11 | 1 |
| 62-5 | .11 | 1 | .12 | 2 | .11 | 1 | .11 | 1 | .11 | 1 |
| 104-3 | .15 | 3 | .25 | 4 | .01 | 1 | .33 | 5 | .10 | 2 |
| 40-7 | .17 | 1 | .17 | 1 | .17 | 1 | .17 | 1 | .17 | 1 |
| 69-4 | .19 | 2 | .06 | 1 | .19 | 2 | .06 | 1 | .19 | 2 |
| 88-3 | .20 | 1 | .21 | 2 | .21 | 2 | .21 | 2 | .21 | 2 |
| 34-5 | .20 | 1 | .20 | 1 | .20 | 1 | .20 | 1 | .20 | 1 |
| 58-5 | .25 | 1 | .25 | 1 | .25 | 1 | .25 | 1 | .25 | 1 |
| 61-5 | .31 | 1 | | | .35 | 2 | .31 | 1 | .35 | 2 |
| 77-4 | .39 | 2 | .38 | 1 | .39 | 2 | .38 | 1 | .39 | 2 |
| 82-3 | .50 | 1 | .50 | 1 | .50 | 1 | .50 | 1 | .50 | 1 |
| 105-3 | .53 | 1 | 1.14 | 4 | .71 | 2 | 1.14 | 4 | .74 | 3 |
| 48-5 | .59 | 1 | .59 | 1 | .59 | 1 | .59 | 1 | .59 | 1 |
| 60-5 | .69 | 1 | .71 | 2 | .69 | 1 | .72 | 3 | .72 | 3 |

Table 3.7 (Continued)

| | 1 | | 2 | | 3 | | 4 | | 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 47-5 | 1.06 | 1 | 1.06 | 1 | 1.06 | 1 | 1.06 | 1 | 1.06 | 1 |
| 97-3 | 3.38 | 1 | 3.48 | 2 | 3.38 | 1 | 3.48 | 2 | 3.38 | 1 |
| 17-5 | | | .01 | 1 | | | .01 | 1 | | |
| 97-4 | | | .02 | 1 | | | .02 | 1 | | |
| 25-7 | | | .02 | 2 | | | .01 | 1 | | |
| 11-5 | | | .02 | 2 | | | .01 | 1 | | |
| 11-6 | | | .03 | 2 | | | .02 | 1 | | |
| 7-7 | | | .03 | 1 | .03 | 1 | .03 | 1 | .04 | 2 |
| 10-5 | | | .04 | 1 | | | | | | |
| 1-6 | | | .04 | 3 | .03 | 2 | .01 | 1 | | |
| 72-5 | | | .07 | 1 | | | .07 | 1 | .07 | 1 |
| 88-4 | | | .20 | 3 | .04 | 2 | .20 | 3 | .02 | 1 |
| 10-7 | | | .34 | 1 | | | .34 | 1 | | |
| 13-5 | | | | | .02 | 1 | .02 | 1 | .02 | 1 |
| 13-6 | | | | | | | .01 | 1 | | |
| Sum of Ranks | | 58 | | 78 | | 62 | | 81 | | 66 |
| Rank Order of APDs | | 1 | | 4 | | 2 | | 5 | | 3 |

Table 3.8 Futures Foregone Scores and Ranking of APDs by PNCs for Life Form Bushes

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 58-4 | .01 | 1 | .01 | 1 | .01 | 1 | | | .01 | 1 |
| 32-7 | .01 | 1 | .02 | 2 | .02 | 2 | .03 | 3 | .02 | 2 |
| 32-5 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 103-4 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 7-7 | .01 | 1 | .01 | 1 | .02 | 2 | | | .03 | 3 |
| 86-2 | .02 | 2 | | | .01 | 1 | | | | |
| 73-4 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 62-4 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 51-5 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 49-5 | .02 | 1 | | | | | | | | |
| 44-6 | .02 | 2 | .02 | 2 | .01 | 1 | .02 | 2 | .01 | 1 |
| 41-7 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 21-5 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 | .02 | 1 |
| 14-6 | .02 | 1 | | | .02 | 1 | .02 | 1 | | |
| 3-6 | .02 | 2 | | | .02 | 2 | | | .01 | 1 |
| 1-6 | .02 | 2 | .05 | 4 | .04 | 3 | .01 | 1 | .01 | 1 |
| 30-7 | .03 | 1 | .04 | 2 | .03 | 1 | .04 | 2 | .03 | 1 |
| 15-5 | .03 | 2 | | | | | .03 | 2 | .01 | 1 |
| 107-7 | .03 | 2 | .02 | 1 | .04 | 3 | .02 | 1 | .03 | 2 |
| 106-3 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 |
| 4-6 | .03 | 2 | | | | | .02 | 1 | | |
| 66-2 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 |

Table 3.8 (Continued)

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 89-2 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 |
| 74-4 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 |
| 49-7 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 | .05 | 1 |
| 25-7 | .05 | 3 | .05 | 3 | .01 | 1 | .05 | 3 | .02 | 2 |
| 66-4 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 |
| 23-5 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 |
| 76-4 | .07 | 1 | .07 | 1 | .07 | 1 | .07 | 1 | .07 | 1 |
| 56-5 | .07 | 2 | .05 | 1 | .07 | 2 | .07 | 2 | .07 | 2 |
| 28-5 | .07 | 1 | .07 | 1 | .07 | 1 | .07 | 1 | .07 | 1 |
| 102-4 | .07 | 2 | .06 | 1 | .07 | 2 | .07 | 2 | .07 | 2 |
| 2-7 | .07 | 2 | .11 | 4 | | | .09 | 3 | .05 | 1 |
| 92-2 | .09 | 3 | .10 | 4 | .08 | 2 | .10 | 4 | .07 | 1 |
| 88-3 | .11 | 2 | .08 | 1 | .11 | 2 | .08 | 1 | .11 | 2 |
| 66-5 | .11 | 1 | .12 | 2 | .11 | 1 | .11 | 1 | .11 | 1 |
| 69-4 | .13 | 2 | .04 | 1 | .13 | 2 | .04 | 1 | .13 | 2 |
| 31-5 | .13 | 1 | .13 | 1 | .13 | 1 | .13 | 1 | .13 | 1 |
| 102-3 | .13 | 1 | .15 | 3 | .14 | 2 | .15 | 3 | .14 | 2 |
| 62-5 | .15 | 1 | .20 | 3 | .17 | 2 | .20 | 3 | .20 | 3 |
| 60-5 | .16 | 1 | .19 | 2 | .16 | 1 | .19 | 2 | .19 | 2 |
| 53-4 | .16 | 3 | .01 | 1 | .11 | 2 | .01 | 1 | .16 | 3 |
| 40-7 | .17 | 1 | .17 | 1 | .17 | 1 | .17 | 1 | .17 | 1 |
| 105-3 | .27 | 1 | .42 | 3 | .33 | 2 | .42 | 3 | .33 | 2 |

Table 3.8 (Continued)

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 92-1 | .30 | 2 | .28 | 1 | .30 | 2 | .28 | 1 | .30 | 2 |
| 68-4 | .31 | 1 | .31 | 1 | .31 | 1 | .31 | 1 | .31 | 1 |
| 61-5 | .32 | 2 | .01 | 1 | .34 | 3 | .32 | 2 | .34 | 3 |
| 49-6 | .32 | 1 | .32 | 1 | .32 | 1 | .32 | 1 | .32 | 1 |
| 77-4 | 1.06 | 1 | 1.06 | 1 | 1.06 | 1 | 1.06 | 1 | 1.06 | 1 |
| 58-5 | 2.87 | 2 | 2.85 | 1 | 2.87 | 2 | 2.87 | 2 | 2.85 | 1 |
| 93-4 | | | .01 | 1 | .01 | 1 | .01 | 1 | | |
| 91-2 | | | .01 | 1 | | | .01 | 1 | | |
| 88-4 | | | .01 | 1 | | | .01 | 1 | | |
| 13-5 | | | .01 | 1 | .01 | 1 | .02 | 2 | .02 | 2 |
| 11-6 | | | .01 | 1 | | | | | | |
| 97-4 | | | .02 | 1 | | | .02 | 1 | | |
| 17-5 | | | .05 | 2 | | | .05 | 2 | .01 | 1 |
| 10-7 | | | .20 | 1 | | | .20 | 1 | | |
| 21-7 | | | | | .01 | 1 | | | .01 | 1 |
| 13-6 | | | | | | | .01 | 1 | | |
| 14-5 | | | | | | | | | .01 | 1 |
| Sum of Ranks | | 71 | | 75 | | 69 | | 78 | | 70 |
| Rank Order of APDs | | 3 | | 4 | | 1 | | 5 | | 2 |

Table 3.9 Futures Foregone Scores and Ranking of APDs by PNCs for Life Form Trees

| | APD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 97-2 | .01 | 1 | | | | | | | .01 | 1 |
| 89-2 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 86-2 | .01 | 1 | | | | | | | | |
| 66-2 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 57-5 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 21-7 | .01 | 1 | .02 | 2 | .01 | 1 | .02 | 2 | .01 | 1 |
| 21-5 | .01 | 1 | .02 | 2 | .01 | 1 | .01 | 1 | .01 | 1 |
| 12-5 | .01 | 1 | | | .03 | 3 | .02 | 2 | .04 | 4 |
| 103-3 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 | .01 | 1 |
| 3-6 | .01 | 1 | .08 | 2 | .01 | 1 | .08 | 2 | .01 | 1 |
| 88-4 | .02 | 1 | | | | | | | | |
| 73-4 | .02 | 2 | .02 | 2 | .01 | 1 | .02 | 2 | .02 | 2 |
| 25-7 | .02 | 2 | .02 | 2 | .01 | 1 | .02 | 2 | .01 | 1 |
| 90-2 | .03 | 1 | | | .05 | 3 | | | .04 | 2 |
| 89-4 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 |
| 14-5 | .03 | 2 | | | .01 | 1 | | | | |
| 107-7 | .03 | 2 | .02 | 1 | .04 | 3 | .02 | 1 | .03 | 2 |
| 106-3 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 | .03 | 1 |
| 2-6 | .03 | 2 | .02 | 1 | .06 | 3 | .06 | 3 | .07 | 4 |
| 97-4 | .04 | 1 | | | | | | | | |
| 66-5 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 |
| 41-7 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 | .04 | 1 |
| 12-6 | .04 | 2 | .02 | 1 | .05 | 3 | .02 | 1 | .04 | 2 |

Table 3.9 (Continued)

|  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
|---|---|---|---|---|---|---|---|---|---|---|
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 94-3 | .05 | 1 | .05 | 1 | .05 | 1 | .06 | 2 | .05 | 1 |
| 80-4 | .05 | 1 | .05 | 1 | .05 | 1 | .07 | 2 | .05 | 1 |
| 95-3 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 | .06 | 1 |
| 93-4 | .06 | 2 | .05 | 1 | .05 | 1 | .05 | 1 | .06 | 2 |
| 30-7 | .07 | 1 | .08 | 2 | .07 | 1 | .08 | 2 | .07 | 1 |
| 1-6 | .07 | 3 | .01 | 1 | .02 | 2 |  |  | .01 | 1 |
| 61-5 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 | .08 | 1 |
| 19-5 | .09 | 3 | .02 | 1 | .14 | 5 | .05 | 2 | .12 | 4 |
| 74-4 | .10 | 1 | .10 | 1 | .10 | 1 | .10 | 1 | .10 | 1 |
| 66-4 | .10 | 2 | .09 | 1 | .09 | 1 | .09 | 1 | .10 | 2 |
| 102-4 | .10 | 1 | .10 | 1 | .10 | 1 | .10 | 1 | .10 | 1 |
| 101-4 | .10 | 1 | .10 | 1 | .10 | 1 | .10 | 1 | .10 | 1 |
| 91-5 | .11 | 1 | 1.29 | 2 | 1.36 | 3 | 1.29 | 2 | 1.29 | 2 |
| 63-5 | .11 | 1 | .11 | 1 | .11 | 1 | .11 | 1 | .11 | 1 |
| 56-5 | .11 | 1 | .11 | 1 | .11 | 1 | .11 | 1 | .11 | 1 |
| 23-5 | .11 | 1 | .11 | 1 | .11 | 1 | .11 | 1 | .11 | 1 |
| 16-5 | .11 | 3 | .06 | 1 |  |  | .10 | 2 | .06 | 1 |
| 101-3 | .11 | 1 | .11 | 1 | .12 | 2 | .11 | 1 | .12 | 2 |
| 92-2 | .12 | 1 | .16 | 3 | .12 | 1 | .15 | 2 | .12 | 1 |
| 84-2 | .12 | 1 | .16 | 3 | .12 | 1 | .16 | 3 | .13 | 2 |
| 73-5 | .13 | 1 | .45 | 4 | .30 | 2 | .45 | 4 | .31 | 3 |
| 69-4 | .13 | 2 | .05 | 1 | .13 | 2 | .05 | 1 | .13 | 2 |

Table 3.9 (Continued)

| | 1 | | 2 | | 3 | | 4 | | 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 68-4 | .13 | 1 | .13 | 1 | .13 | 1 | .13 | 1 | .13 | 1 |
| 102-3 | .16 | 2 | .16 | 2 | .15 | 1 | .16 | 2 | .15 | 1 |
| 53-4 | .21 | 3 | .01 | 1 | .15 | 2 | .01 | 1 | .21 | 3 |
| 11-5 | .21 | 4 | .17 | 2 | .20 | 3 | .26 | 5 | .16 | 1 |
| 1-7 | .21 | 1 | | | .21 | 1 | | | .21 | 1 |
| 11-6 | .30 | 3 | .11 | 1 | .30 | 3 | .14 | 2 | .14 | 2 |
| 91-4 | .31 | 1 | .31 | 1 | .31 | 1 | .31 | 1 | .31 | 1 |
| 10-7 | .33 | 2 | .11 | 1 | | | .11 | 1 | | |
| 92-4 | .37 | 1 | .38 | 2 | .38 | 2 | .38 | 2 | .37 | 1 |
| 77-4 | .47 | 1 | .47 | 1 | .47 | 1 | .47 | 1 | .47 | 1 |
| 92-3 | .53 | 1 | .53 | 1 | .53 | 1 | .53 | 1 | .53 | 1 |
| 87-2 | .55 | 1 | .55 | 1 | .55 | 1 | .55 | 1 | .55 | 1 |
| 92-1 | .65 | 3 | .61 | 1 | .63 | 2 | .61 | 1 | .63 | 2 |
| 40-7 | .68 | 1 | .68 | 1 | .68 | 1 | .68 | 1 | .68 | 1 |
| 62-5 | 1.24 | 1 | 1.24 | 1 | 1.24 | 1 | 1.24 | 1 | 1.24 | 1 |
| 60-5 | 3.15 | 1 | 3.28 | 2 | 3.15 | 1 | 3.15 | 1 | 3.15 | 1 |
| 58-4 | 24.14 | 1 | 24.14 | 1 | 24.14 | 1 | 24.14 | 1 | 24.14 | 1 |
| 13-6 | | | .01 | 1 | | | | | | |
| 13-5 | | | .01 | 1 | | | | | | |
| 104-3 | | | .01 | 1 | | | .01 | 1 | | |
| 17-5 | | | .03 | 2 | | | .03 | 2 | .01 | 1 |
| 5-7 | | | .03 | 1 | | | .03 | 1 | | |
| 7-7 | | | .04 | 2 | .01 | 1 | .05 | 3 | .01 | 1 |

Table 3.9 (Continued)

|  | APD |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  | 1 |  | 2 |  | 3 |  | 4 |  | 5 |  |
| PNC | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank | F.F. | Rank |
| 10-5 |  |  | .12 | 1 |  |  | .21 | 2 |  |  |
| 97-1 |  |  |  |  | .01 | 1 |  |  |  |  |
| 91-2 |  |  |  |  |  |  | .01 | 1 |  |  |
| Sum of Ranks |  | 88 |  | 81 |  | 85 |  | 90 |  | 84 |
| Rank Order of APDs |  | 4 |  | 1 |  | 3 |  | 5 |  | 2 |

Table 3.10 Summed Rank Scores of Activities for APDs

| | APD | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Activities | Summed Rank Score | Summed Rank Score | Summed Rank Score | Summed Rank Score | Summed Rank Score |
| Wood Harvest | 29 | 26 | 27 | 35 | 23 |
| Domestic Grazing | 27 | 19 | 22 | 32 | 23 |
| Wild Ruminant Grazing | 56 | 58 | 57 | 66 | 54 |
| Water Yield | 73 | 66 | 61 | 74 | 62 |
| Dispersed Recreation | 30 | 29 | 26 | 30 | 24 |
| Life Form Water | 88 | 93 | 92 | 105 | 99 |
| Life Form Ground | 58 | 78 | 62 | 81 | 66 |
| Life Form Bushes | 71 | 75 | 69 | 78 | 70 |
| Life Form Trees | 88 | 81 | 85 | 90 | 84 |
| Sum of Summed Scores | 520 | 525 | 501 | 591 | 505 |
| Rank Order of APDs | 3 | 4 | 1 | 5 | 2 |

# CHAPTER 4: ANALYSIS OF SOCIAL CONFLICT PATTERNS

## 4.1 Overview

Two stages must be completed in the analysis of the social conflict patterns associated with each APD:

Stage 1--data must be gathered which reveal whether people engaged in specific activities will be for, against, or neutral to, a specific profile of outputs produced by a given APD on a given PNC. This first stage of the analysis is described in the procedural steps outlined in section 4.2 below.

Stage 2--social conflict analytical procedures are employed to rank APDs according to the estimated amount to which APDs polarize activity groups on each PNC.[1] Highly polarized conflict patterns (i.e., when cleavages overlap making opponents on one cleavage opponents on all) and cross-cutting conflict patterns, (i.e., allies on some are opponents on others) are graphically displayed in Figure 4.1. The procedures for actually arriving at conflict polarization scores and APD ranks in terms of those scores are outlined in section 4.3 below.

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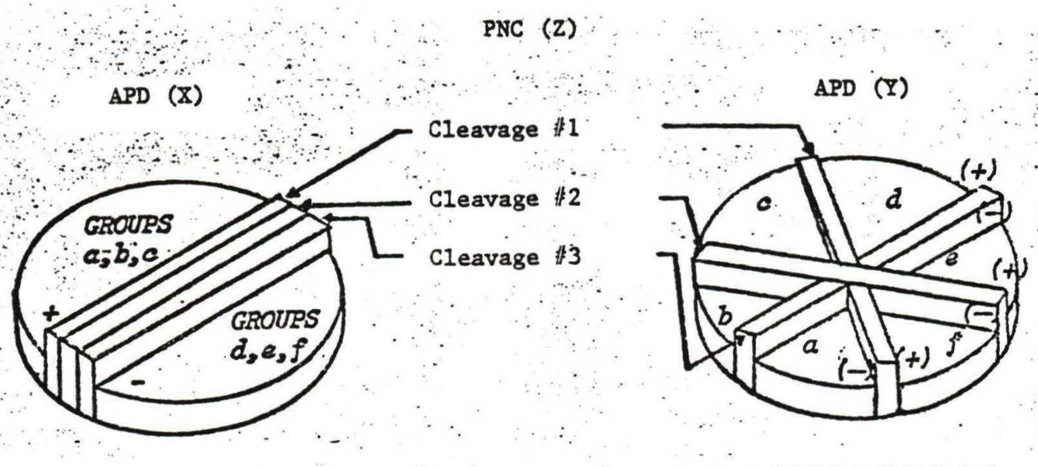
[1] Activity group - a group engaged in one activity on the PNC land/water base. For a complete list of the 17 activity groups employed in this study, see the list on the response sheets in Attachment D.

Figure 4.1

Examples of Conflict Cleavages and
Possible Stances Taken by Affected Activity Groups



OVERLAPPING CLEAVAGES
(polarized)

CROSS-CUTTING CLEAVAGES
(non-polarized)

+ = for
- = against

Under APD (X): the affected groups are split on all three issues. Group D is against groups A, B, and C, on all issues. Levels of mutual threat become high, resources are employed to undercut opponent choices, issues become non-negotiable, and the context of choice is reduced thereby diminishing social well-being.

Under APD (Y): the affected groups are split on some issues and in agreement on others. For example: group C is against issue #1 but is for issues #2 and #3. Group E is against issue #3 but for issues #1 and #2. In this example, groups C and E disagree on issues #1 and #3, but they agree on issue #2. Levels of mutual threat become low, resources need not be mobilized to undercut sometime allies, issues become negotiable, and the context of choice is sustained thereby enhancing social well-being.

In the case illustrated above, APD (Y) is the more preferable.

Judgment is necessary as a source of conflict data. These judgments are obtained in the form of estimates made by knowledgeable panels of individuals regarding the anticipated positive, negative, or neutral position to be taken by activity groups relative to changes projected by NIMRAS. These changes are brought about by the effects of each APD on each studied PNC for 1990 as compared to the 1977 situation. Any given panel participant working as a judge of such conflict positions may start with hidden biases, distorted information, fear of ridicule from peers, or reluctance to press views against other participants. It is therefore important that the process of obtaining conflict estimates minimize distortion and maximize the flow of information to individual participants. To accomplish this a modified version of the Delphi technique was employed.

The Delphi technique consists of a sequential series of interrogations based on the feedback of estimates at each step especially focusing on areas of difference. The attempt is to maximize objectivity by keeping communication between panel participants free from the biases of personality and social status.[2] The following section 4.2 describes the particular Delphi method employed.

---

[2] See: K.Q. Hill and J. Fowles, "The Methodological Worth of the Delphi Forecasting Technique," Technological Forecasting and Social Change. Vol 6 (1974), p. 75-88. Juri Pill, "The Delphi Method: Substance, Context; A Critique and An Annotated Bibliography," Socio-Economic Planning Science. Vol. 5 (1971), p. 57-71. H. Sackman, "Delphi Assessment = Expert Opinion, Forecasting and Group Process." Rand Report R-1283-PR. Santa Barbara, Calif.: Rand Corporation, 1974.

### 4.2 Stage One Procedure—Securing the Data Via Delphi Panels

#### 4.2.1 Participant Selection

The total number of participants involved in the exercise was small, and in important ways unrepresentative of the wider population of publics impacted by natural resource decisions across the continental United States. Although a lengthy list of diverse organizations was originally invited to send a representative to participate in the conflict workshop, not all commited themselves to the workshop and of those which commited themselves, not all actually participated in the sessions (See attachment A.1) Nevertheless, the participants did represent a reasonably broad range of publics (See attachment A.2) and participants indicated that they had knowledge of, and experience in, the several PNC areas of the United States which they were expected to examine (See attachment B.1 & B.2). It was essential that participants were knowledgable of the PNCs being examined so they would be able to identify an APD's impact on a particular activity group whether or not they participated in that activity. It is reasonable to expect that knowledgable persons can identify impacts--positive or negative--on activities even if they do not personally engage in such activities. In fact, previous studies indicate that most participants reach rather quick consensus as to whether a given management alternative will be responded to positively, negatively, or neutrally by different activity groups.[3]

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[3] See: David M. Freeman, *A Social Well-Being Analysis of Four Proposed Management Alternatives for the Boulder Grand Divide Planning Unit*, Arapaho and Roosevelt National Forest, May 4, 1976; *A Social Well-Being Analysis of Four Proposed Management Alternatives on the East Grand Planning Unit*, Arapaho and Roosevelt National Forests, May 2, 1977; *A Social Well-Being Analysis of Four Proposed Management Alternatives on the Poudre River Wild and Scenic River Area*, Arapaho and Roosevelt National Forest, June 30, 1978.

Participants completed background information sheets (See attachment C) which provided the necessary information to assign each participant to one of four panels in a manner which would allow study coordinators to assure that each panel consisted of members having maximal knowledge of the PNC areas to be examined and to determine the impact of organizational ideologies on study results (See Figure 4.2).

### 4.2.2 Constructing the Panels

On the basis of scores calculated from items 8a-8c on each person's background information sheet (See attachment C) each participant was placed in the appropriate ideological category—environmentalist or commodity producer (See Figure 4.2). Within each ideological category, participants were further categorized on the basis of their familiarity with eastern vs western geographical areas of the United States.

### 4.2.3 Convening the Panel Participants

Participants gathered on July 11, 1979, in the Ecology Theatre of the National Museum of Natural History, Washington, D.C. for a two-hour orientation session. Participants were introduced to the social conflict procedure and informed of their tasks. Participants then proceeded to convene in their respective panels (See Figure 4.2) for the next four working days—July 12, 13, 16, and 17—during which time they made and reviewed estimates according to the procedures specified below in section 4.2.4.

### 4.2.4 Panel Estimation Procedure

Participants met in their respective panels to make their individual estimates as to the positive, negative, or neutral positions seventeen

FIGURE 4.2.

CONFLICT PANEL STRUCTURE ACCORDING TO PANEL MEMBERS KNOWLEDGE OF LAND ISSUES IN DIFFERENT REGIONS AND IDEOLOGICAL DIFFERENCES

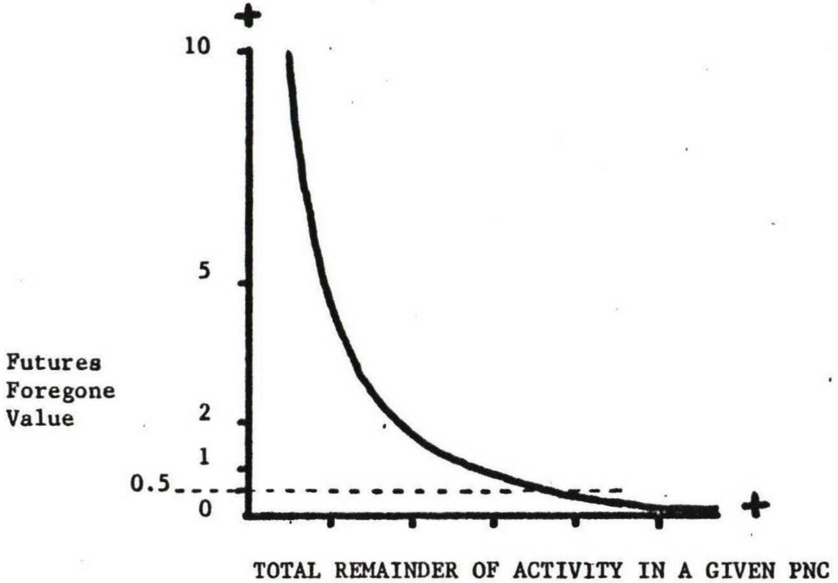
| | |
|---|---|
| **PANEL 1**<br>WESTERN<br>ENVIRONMENTALISTS | **PANEL 2**<br>EASTERN<br>ENVIRONMENTALISTS |
| **PANEL 3**<br>WESTERN<br>"MIX" * | **PANEL 4**<br>EASTERN<br>COMMODITY PRODUCERS |

*NOTE: Although we had anticipated the presence of panelists who would be commodity producers with knowledge of land issues in the western areas of the United States, the overall composition in the workshop made it necessary to combine environmentalists with commodity producers for all four working days.

activity groups would take in relation to projected changes each APD would make in displayed PNC profiles (See attachment D for example of response sheets employed by participants for one PNC). Each PNC profile detailed what changes in activities were projected by NIMRAS for wood harvest, domestic grazing, wild ruminant grazing, dispersed recreation, and wilderness. Each panelist employed available PNC background information and maps in the making of conflict position estimates. After each individual made an initial set of estimates for all activity groups on all APDs for a given PNC, the set of estimates was collected, reproduced, and returned to panelists for their review and discussion. Attention of the panelists was focused on those estimates which varied substantially from panelist to panelist. In those cases where panelists disagreed substantially, the discussion drew out rationales for each of the divergent estimates, and the panelists then proceeded to select for themselves the estimate with the most compelling rationale. The median value for panelist estimates was computed, displayed, and reviewed as part of the discussion process; in every instance, panelists arrived at a consensus as to whether the median--the panel product as distinguished from individual estimates--represented a valid number or not. In those instances where the panel found the median to be problematic, the median was changed as a consequence of group discussion, focusing on a review of the PNC information; the APD profiles, and consideration of the alternative justifications which could be advanced. Once the median values were agreed upon by all members of a panel for a given PNC, the panel proceeded to repeat the estimation process for the next PNC.

### 4.2.5 Selecting the PNCs for Conflict Analysis

No panel in four working days, could reasonably be expected to become familiar with and make estimates for all 106 PNCs constituting the continental United States. Therefore, a criterion was required to select some subset of PNCs on which the conflict analysis could be focused. Such a criterion is available given the nature of the futures foregone analysis. Given that all PNCs could not be incorporated in the conflict workshop, panelists focused on those which earned a futures foregone score equal to, or greater than, .5 on the futures foregone scale (See Figure 4.2.5). Employing the .5 level as a cutoff point for admission of a PNC to the conflict analysis, 28 PNCs were initially selected. However, upon inspection of this list of 28 PNCs, it became obvious that several of the listed PNC's had artificially high futures foregone scores as a simple function of the fact that the amount of resource output supporting a given activity category was such a trivial amount that even a more trivial loss of that amount produced a very high score. To handle this bias, all PNCs were ranked from greatest producer to smallest producer of that resource output— e.g. timber, livestock grazing. The median output value of the highest ten percent of the PNC producers of that output was computed. Any PNC with a futures foregone value equal to, or greater than, .5 on the futures foregone scale which did not produce one percent of the median value of the highest ten percent of the PNC producers was disregarded for purposes of the conflict exercise. Panelist time, therefore, was employed examining PNC's where futures foregone scores were equal to or greater than .5



PNC's SECURING A FUTURES FOREGONE VALUE ABOVE THE 0.5 LEVEL FOR ANY ONE OR MORE OF THE TEN ACTIVITIES WERE SELECTED FOR CONFLICT ANALYSIS.

Figure 4.2.5 Logic of PNC Selection for Conflict Analysis

on the futures foregone scale (See Figure 4.2.5) and upon which the output production volume, in 1977, exceeded one percent of the median of the highest ten percent of the PNC producers of that output. Five PNCs failed to meet the one percent criterion, leaving 23 PNCs for the workshop. PNCs 92-2 and 92-3, in addition, had to be deleted because they were scattered in such small areas across much of the eastern United States along river and creek bottoms that their many segments could not be located on available maps; their fragmented and dispersed nature would not allow a coherent conflict analysis to be performed. Therefore, 21 PNCs were finally selected. Table 4.2.5 presents the PNCs examined by the panels in the conflict workshop.

A major caveat must be entered with regard to PNC selection. Social well-being and political power are two different phenomena. There can be, from a purely political standpoint, PNCs with real conflicts which bear looking at because powerful and important groups are involved. PNCs were, however, not picked on the basis that they contained powerful groups capable of exercising well honed linkages to Washington, D.C. or any other center of decision-making. PNC's were picked solely on the basis of their futures foregone score and it is very possible that there are some of these which are of little interest to the politically influential. Futhermore, by no means do we wish to imply that there are no conflicts of importance on those PNCs not selected for the conflict analysis. There is every reason to believe that there are politically significant conflicts on PNCs not selected for the conflict analysis. It is fully justifiable, however, to use the limited personnel and time available for the conflict

Table 4.2.5

PNC Assignments to Panels

| Panels 1 & 3<br>West | Panels 2 & 4<br>East |
|---|---|
| PNC - Region | PNC - Region |
| 14-6 | 91-5 |
| 58-5 | 95-4 |
| 60-5 | 97-3 |
| 62-5 | 82-3 |
| 63-5 | 77-4 |
| 40-7 | 58-4 |
| 47-5 | 106-3 |
| 30-7 | 102-3 |
| 66-5 | 105-3 |
| 49-6 | 88-3 |
| 89-5 | |
| N = 11 | N = 10 |

workshop to examine those PNCs where the futures foregone score equaled or exceeded .5. Even though the selection of PNCs makes sense in terms of the technical social well-being logic, it may be that politically sensitive individuals would have wished that other PNCs had been selected. It can only be hoped that, if this analysis should be repeated in the future, all PNCs can be analyzed for conflict implications of APDs.

A second caveat follows from the first. The conflict analysis was not intended to direct specific management actions on particular PNC's. This analysis represents a rough first cut to examine which APD's fare well or poorly across 106 PNCs constituting the continental United States. Analysis such as performed in this study cannot be of use to direct specific management actions in specific PNC's or other local units. To be of use, the analysis would have to be specifically focused on such units in terms of the specific management options being proposed and would have to include the specific structure of conflict cleavages existing at present in the PNC unit prior to consideration of APD impacts on that structure.

### 4.3 Calculating Extent of Conflict Polarization on Specific PNCs

The following steps compose the method by which APD conflict polarization scores were calculated.

4.3.1 A base group activity category is selected from among those listed on the participant response sheet (See attachment D). The choice is arbitrary but it is computationally easier when a base group activity category is selected which has been estimated to take non-neutral positions on all APDs. For eastern panels the base group used for computation was "wildlife/harvest" whereas "wildlife/non-harvest" was selected as base group for western panels. The list of activity groups employed in the conflict analysis can be found in Table 4.3.

4.3.2 Each other group actiivty category can then be viewed as taking a position the same as, of neutrality toward, or in opposition to, the position of the base group. For example, mineral activity groups are either estimated to have the same position as, be in opposition to, or be neutral with regard to, the wildlife/harvest base group relative to the changes projected by the NIMRAS projection of an APD's impact on the PNC.

4.3.3 The position of each group activity category is recorded as the "observed position" (See Table 4.3). A number is inserted into the observed position column which equals the number of times each group activity category is estimated by the panel to be allied with, opposed to, or neutral to the position taken by the base group.[4]

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[4] On each PNC, the maximum number of times any given activity group could be allied with, or opposed to, a base group equalled five. Panelists estimated the positions of each activity group (including that one which was selected as base) on five issues—issues created by the changes in each APD's output levels on: 1) wood harvest, 2) domestic grazing, 3) wild ruminant grazing, 4) dispersed recreation, and 5) wilderness recreation. On specific PNCs one or more of these five outputs did not exist (e.g. timber) thereby reducing the maximum number of things for activity groups to fight about.

## Table 4.3

### An Example of Social Conflict Calculations
### (a comparison of estimated to ideal conflict patterns)

Panel #1

| West | | PNC: 66-5 | | | | Base Group = Wildlife (non-harvest) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | APD #1 | | | | | | | | | |
| | Deviations | | | | | | Deviation From Expected | Sum of Deviations (by group) | | |
| Activities | Observed (estimated) | | | Expected (ideal) | | | | | Observ | |
| | for | against | neutral | for | against | neutral | | | for | ag |
| Farming | 0 | 2 | 1 | 1 | 1 | | 1/1 | 2 | | |
| Ranching | 0 | 2 | 1 | 1 | 1 | | 1/1 | 2 | | |
| Agricultural Water | 1 | 1 | 1 | 1 | 1 | | 0/0 | 0 | | |
| Municipal Water | 0 | 0 | 3 | * | * | | --- | --- | | |
| ~~Timber~~------- | ** | ------- | ------- | --- | ------- | ------- | ------- | ------- | | |
| Mineral Development | 0 | 0 | 3 | * | * | | --- | --- | | |
| Energy Development | 0 | 0 | 3 | * | * | | --- | --- | | |
| Business Services | 0 | 1 | 2 | .5 | .5 | | .5/.5 | 1 | | |
| Retail Sales | 1 | 1 | 1 | 1 | 1 | | 0/0 | 0 | | |
| Dispersed Recreation (Non-Motor) | 2 | 0 | 1 | 1 | 1 | | 1/1 | 2 | | |
| Dispersed Recreation (Motor) | 2 | 0 | 1 | 1 | 1 | | 1/1 | 2 | | |
| Picnicing and Camping | 2 | 0 | 1 | 1 | 1 | | 1/1 | 2 | | |
| ~~Downhill Skiing~~------ | ** | ------- | ------- | --- | ------- | ------- | ------- | ------- | -- | |
| Private Recreation Development | 1 | 0 | 2 | .5 | .5 | | .5/.5 | 1 | | |
| Wilderness | 3 | 0 | 0 | 1.5 | 1.5 | | 1.5/1.5 | 3 | | |
| Wildlife (Non-Harvest) | | | ---- | - Base Group ----- | | | | | | |
| Wildlife (Harvest) | 3 | 0 | 0 | 1.5 | 1.5 | | 1.5/1.5 | 3 | | |

The total sum of deviations across groups = 18

* The "Expected" deviations are only derived from non-neutral "Observed" deviations. Therefore, in cases where there are no non-neutral observed estimations, expected deviations equal zero.

** These activities did not exist in this particular PNC.

4.3.4 The observed pattern of support and opposition of each group activity category is then compared to the expected pattern which would ideally occur if there were a perfect cross-cutting pattern. One would expect that each group activity category would be half the time for the base group and half the time against (See Table 4.3, deviations expected). One simply subtracts the number of times a given activity category is neutral from the total number of times a positive, negative, or neutral position is taken, and then divides the remaining number of non-neutral positions by half to arrive at the ideally expected number of times one would expect to find the activity group in support of, and opposed to, the base group in an ideally cross-cutting world (See Table 4.3, expected).

4.3.5 The question is now asked: how much deviation is there between the observed conflict positions and the ideally expected patterns (i.e. perfectly cross-cutting non-polarized cleavage patterns)? Deviation scores are computed by determining the difference between the actually observed values and the expected values (see deviations from expected column, Table 4.3). It is the deviations *qua* deviations that are of significance; signs are dropped and all deviation values are added (see sum of deviations column, Table 4.3).

4.3.6 APDs will have varying sums of deviations from the ideally cross-cutting non-polarized pattern , (Table 4.3 shows the format for only one APD.) It is now possible to rank APDs from lowest number of deviations (most cross-cutting) to highest number of deviations (most polarizing).

4.3.6 For each PNC an APD is assigned its rank ranging from least (rank 1) to most polarizing (highest rank). These ranks, in turn, can be summed across PNCs to determine which APD is least polarizing across the twenty-one PNCs studied in the workshop, which APD is second ranked, third ranked, fourth ranked, and fifth ranked, i.e., most polarizing across the PNCs.

4.3.7 An examination of the data reveal that there were no full reversals of APD rankings by the two panels working on the ten PNCs located in the eastern half of the United States (Panels 2/4). (See reliability section of Appendix, Vol. 2 B.3.) In the case of the two western focused panels (1 and 3) a full reversal of ranks appeared in 1 PNC out of the eleven PNCs studied.[5] In order to cope with the lack of agreement among panels, panel rankings were combined in a paired panel sum of rankings which served to give equal weight to each panel's judgment in ascribing rankings to the APDs.

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[5] Note: Although there was one (1) full reversal of APD ranks between the two panels examining the eleven western PNCs, not all other rankings between panels were absolutely identical. For example, in the east, panels 2 and 4 generated absolutely identical APD rankings on eight of the ten PNCs examined. In the cases of the two non-identical PNCs, panels 2 and 4, ranked APDs 1, 2, 5 in on identical fashion but disagreed on the rankings for APD 3, 4 in one instance. In the second instance, one panel tied two APDs left untied by the other panel. Among the western PNCs, the two panels, 1 and 3, independently generated identical APD polarization ranks in seven of the eleven studied PNCs. In one PNC a full reversal of ranks occured between panels and in three PNCs some APDs secured identical ranks by the two panels whereas other APDs obtained different ranks. See Appendix Vol 2. B. 3 for a full discussion of the inter-panel reliability of the conflict data.

## 4.4 Presentation of the Conflict Data

The number of times which each APD was ranked first (least polarizing) to fourth (most polarizing)[6] by both panels examining each PNC, appears in the tables of this section. The presentation is broken down into national and regional levels.

### 4.4.1 National Level APD Conflict Polarization Rankings

Table 4.4.1 presents the National APD rankings by panel—i.e., panels 1 and 3 are combined for the western PNCs and panels 2 and 4 are combined for the eastern PNCs. As previously noted in section 4.3.6, by combining the rankings of each pair of panels examining the eastern and western PNCs, respectively, the differences in panel ranking is adjusted for in a manner that weights each panel's knowledge and judgment equally. Two things must be noted about Table 4.4.1:

—First, APD 5 wins first place in the conflict polarization analysis because it has the lowest sum of ranks of any of the APDs (46). APD 3 assumes second place, APDs 2 and 4 tie for third place, and APD 1 is last ranked and is therefore viewed as most polarizing.

—Second, with the exception of the gap between the first and second place APDs, APD sums of ranks are very close

---

[6] Because of ties among the five APDs, no fifth ranking occured.

## TABLE 4.4.1

## NATIONAL APD RANKING BY PANELS*

|  | APD 1 |  | APD 2 |  | APD 3 |  | APD 4 |  | APD 5 |  |
|---|---|---|---|---|---|---|---|---|---|---|
| RANK | Frequency of APD in Rank Across All PNCs for Panels | Rank Score (Frequency in Rank X Rank Value) | Frequency of APD in Rank Across All PNCs for Panels | Rank Score (Frequency in Rank X Rank Value) | Frequency of APD in Rank Across All PNCs for All Panels | Rank Score (Frequency in Rank X Rank Value) | Frequency of APD in Rank Across All PNCs for Panels | Rank Score (Frequency in Rank X Rank Value) | Frequency of APD in Rank Across All PNCs for Panels | Rank Score (Frequency in Rank X Rank Value) |
| 1 | 32 | 32 | 29 | 29 | 31 | 31 | 30 | 30 | 30 | 30 |
| 2 | 3 | 6 | 10 | 20 | 8 | 16 | 9 | 18 | 8 | 16 |
| 3 | 5 | 15 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 4 | 0 | 0 |
|  | Summed Ranks Across PNCs = for All Panels | 53 |  | 52 |  | 51 |  | 52 |  | 46 |

*Ranking of panels 1 and 3 (western PNCs) were combined with the rankings of panels 2 and 4 (eastern PNCs) to arive at the national APD rankings. For example, the panels examining APD 1 in all PNC's accross the country gave APD 1 32 first ranks, 3 second ranks, 5 third ranks, and no fourth ranks.

(51,52,52,53) for the second, third, and fourth place finishers. APD 5 clearly dominates as the least polarizing of the five APDs' but the remaining APDs are very close indeed.

### 4.4.2 Regional Level APD Conflict Polarization Rankings

Tables 4.4.2a - 4.4.2e present the APD rankings by RPA region. Because no PNCs from RPA regions 1 and 2 secured futures foregone scores equal to, or greater than, .5 on the futures foregone scale there are no tables for RPA regions 1 and 2. Tables for the regions should be read in the same manner as the national APD ranking table 4.4.1. This is to say that the tables present the number of times which each pair of panels examining the same PNCs ranked a given APD first, second, third, fourth, or fifth relative to each other APD on all PNCs.

The rank score column on these tables is simply the number of times the respective APD secured a given rank multiplied by the value of the rank. It, of course, goes without saying that the over-all national winner (APD 5) would not necessarily be the first ranked APD in each specific region and this is exactly the case. APD 5, the national winner, in fact is ranked second in Region 3, first in Region 4, last in Region 5, first in Region 6, and it ties for first in Region 7. The regional tables are presented strictly for the information of the interested reader and the over-all conclusions of the following chapter are drawn at the national level of analysis for both futures foregone and social conflict polarization.

## TABLE 4.4.2a

## REGION 3 APD RANKS BY PANELS 2 AND 4 COMBINED*

| | APD 1 | | APD 2 | | APD 3 | | APD 4 | | APD 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| RANK | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score |
| 1 | 10 | 10 | 9 | 9 | 11 | 11 | 7 | 1 | 8 | 8 |
| 2 | 0 | 0 | 3 | 6 | 1 | 2 | 3 | 6 | 2 | 4 |
| 3 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sum of Ranked Scores | | 16 | | 15 | | 13 | | 7 | | 12 |

PNC (N) = 6

PNC 97-3
82-3
106-3

PNC 102-3
105-3
88-3

*Note: Since the two panels agreed to APD rankings for the majority of PNCs, but disagreed in a few instances, panels were weighted equally. By summing the ranks of both panels for each APD, APD scores were adjusted for any disagreement.

## TABLE 4.4.2b

## REGION 4 APD RANKS BY PANELS 2 AND 4 COMBINED*

| | APD 1 | | APD 2 | | APD 3 | | APD 4 | | APD 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| RANK | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score |
| 1 | 2 | 2 | 4 | 4 | 2 | 2 | 6 | 6 | 4 | 4 |
| 2 | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 0 | 0 | 0 |
| 3 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sum of Ranked Scores | | 8 | | 4 | | 6 | | 6 | | 4 |

PNC (N) = 3

PNC 95-4
77-4
58-4

*Note: Since the two panels agreed to APD rankings for the majority of PNCs, but disagreed in a few instances, panels were weighted equally. By summing the ranks of both panels for each APD, APD scores were adjusted for any disagreement.

## TABLE 4.4.2c

## REGION 5 APD RANKS BY PANELS 1 AND 3 COMBINED*

| | APD 1 | | APD 2 | | APD 3 | | APD 4 | | APD 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| RANK | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score |
| 1 | 14 | 14 | 11 | 11 | 12 | 12 | 12 | 12 | 10 | 10 |
| 2 | 2 | 4 | 5 | 10 | 4 | 8 | 4 | 8 | 6 | 12 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sum of Ranked Scores | | 18 | | 21 | | 20 | | 20 | | 22 |

PNC (N) = 8

PNC 91-5
58-5
60-5
62-5

PNC 63-5
47-5
66-5
89-5

*Note: Since the two panels agreed to APD rankings for the majority of PNCs, but disagreed in a few instances, panels were weighted equally. By summing the ranks of both panels for each APD, APD scores were adjusted for any disagreement.

## TABLE 4.4.2d

## REGION 6 APD RANKS BY PANELS 1 AND 3 COMBINED*

| | APD 1 | | APD 2 | | APD 3 | | APD 4 | | APD 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| RANK | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score |
| 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 |
| 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 0 | 0 |
| 3 | 1 | 3 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 4 | 0 | 0 |
| Sum of Ranked Scores | | 7 | | 7 | | 8 | | 8 | | 4 |

PNC (N) = 2

PNC 14-6<br>
49-6

*Note: Since the two panels agreed to APD rankings for the majority of PNCs, but disagreed in a few instances, panels were weighted equally. By summing the ranks of both panels for each APD, APD scores were adjusted for any disagreement.

## TABLE 4.4.2e

## REGION 7 APD RANKS BY PANELS 1 AND 3 COMBINED*

| | APD 1 | | APD 2 | | APD 3 | | APD 4 | | APD 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| RANK | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score | Number of Times in Rank | Rank Score |
| 1 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 4 |
| 2 | 0 | 0 | 2 | 4 | 0 | 0 | 1 | 2 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sum of Ranked Scores | | 4 | | 7 | | 4 | | 5 | | 4 |

PNC (N) = 2

PNC 40-7
30-7

*Note: Since the two panels agreed to APD rankings for the majority of PNCs, but disagreed in a few instances, panels were weighted equally. By summing the ranks of both panels for each APD, APD scores were adjusted for any disagreement.

# CHAPTER 5: SUMMARY AND CONCLUSIONS

## 5.1 Overview

Five proposed APDs have been evaluated according to two criteria which, taken together, define the meaning of social well-being--futures foregone for choice opportunities and polarization of social conflict cleavages estimated to be associated with implementation of each APD. That APD which is found to forego the fewest choice opportunities for ten activities, upon which data could be made available by the NIMRAS model as input for this study, is to be preferred. That APD which is estimated by panels to be the least polarizing is preferred from a conflict standpoint. It is the purpose of this chapter to briefly summarize the two components of this social well-being analysis and to synthesize the separate analysis into one over-all set of conclusions.

## 5.2 Summary of the Futures Foregone Analysis

The futures foregone portion of this social well-being analysis posed the question: which APDs would forego to the greatest extent futures for choice opportunities, on 106 PNCs constituting the continental United States, in ten activity categories for which NIMRAS could provide projections for 1990?[1] APDs were ranked from low to high in each PNC according to futures foregone scores. Lowest rank was assigned to the APD foregoing the least future for a given activity and highest rank was assigned to the APD in each PNC obtaining the highest futures foregone score. Table 5.2.1 reports a summary of the futures

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[1] Because wilderness was not diminished under and APD in any PNC, no futures were foregone in the wilderness activity as compared to the base year 1977; therefore wilderness does not appear in Table 5.1

Table 5.2.1 Futures Foregone Summed Rank Scores for APDs

| | APD | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| **Activities** | Summed Rank Score | Summed Rank Score | Summed Rank Score | Summed Rank Score | Summed Rank Score |
| Wood Harvest | 29 | 26 | 27 | 35 | 23 |
| Domestic Grazing | 27 | 19 | 22 | 32 | 23 |
| Wild Ruminant Grazing | 56 | 58 | 57 | 66 | 54 |
| Water Yield | 73 | 66 | 61 | 74 | 62 |
| persed creation | 30 | 29 | 26 | 30 | 24 |
| Life Form Water | 88 | 93 | 92 | 105 | 99 |
| Life Form Ground | 58 | 78 | 62 | 81 | 66 |
| Life Form Bushes | 71 | 75 | 69 | 78 | 70 |
| Life Form Trees | 88 | 81 | 85 | 90 | 84 |
| Sum of Summed Scores | 520 | 525 | 501 | 591 | 505 |
| **Rank Order of APDs** | 3 | 4 | 1 | 5 | 2 |

foregone results for all five APDs across all 106 PNCs by all activity categories. Each value entered under a given APD in Table 5.2.1 represents the sum of all the first, second, third, fourth, and fifth ranks earned by that APD for a given activity across all PNCs.[2] The greater the losses imposed by an APD on a PNC, the higher the rank. The higher the rank of and APD, the greater the futures foregone sum of ranks across activities and PNCs for that APD. When the sum of ranks for specific activities are, in turn, summed the resulting number provides a futures foregone sum of rank scores which represent the over-all position of each APD relative to other APDs. This over-all number encompasses the impact of each APD across all PNCs and across all activities. Table 5.2.1 presents the sum of ranks for each activity and the futures foregone sum of summed rank scores. Table 5.2.2 follows and, based on the values in the bottom row of table 5.2.1, ranks APDs by the over-all futures foregone sum of summed rank scores. Table 5.2.2 reveals that the APDs break out in three distinct sets. APDs three and five nearly tied for first ranking—the first set—have scores close together at 501 and 505 respectively. Set two follows and consists of APDs one and two which are also nearly tied for second rank with scores of 520 and 525. APD 4 is separated from the third and fourth ranked APDs by a wide margin. Over-all APD 4 is a dominant loser in the futures foregone contest. (See Table 5.2.2.)

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[2] Note that this sum of ranks may appear smaller than one would expect for all 106 PNCs because any given activity may not exist on any number of PNCs. The detailed tables, upon which this summary table is based, are presented in Chapter 3 and one may reconstruct the values in Table 5.2.1 by employing the data presented in Chapter 3.

Table 5.2.2 Futures Foregone Rankings of APDs

| Rank | APD | Sum of Summed Scores |
|---|---|---|
| 1 | 3 | 501 |
| 2 | 5 | 505 |
| 3 | 1 | 520 |
| 4 | 2 | 525 |
| 5 | 4 | 591 |

### 5.3 Summary of the Conflict Polarization Analysis

On the basis of the futures foregone analysis a sub-set of 21 PNCs was selected from the larger set of 106 PNCs for a conflict polarization analysis because each of the 21 chosen PNCs obtained futures foregone scores equal to, or exceeding .5 on the futures foregone scale described in Chapter 2 and again in Chapter 4. The significance of the .5 threshold on the futures foregone scale is that it represents the lower end of the inflection point on the futures foregone curve above which losses in activities become much harder to compensate. In essence, beyond a certain point on any given PNC, one more unit of loss becomes more intensely missed and of greater significance than preceding units of loss. The .5 level on the futures foregone scale represents that point and therefore all PNCs sustaining a loss equal to or exceeding that .5 level on any one or more of the activities were held aside for a conflict polarization analysis.

The twenty-one PNCs selected for conflict analysis were each examined by two panels working independently but with the same conflict analytic procedures. Panelists employed a set of procedures for estimating which activity groups, affected by five different NIMRAS projected APD resource mixes for 1990, would take positive, negative, or neutral positions relative to each APD's impact on each of the PNCs subjected to the conflict analysis. The conflict position data generated in the workshop then were employed in a conflict polarization analysis, described in Chapter 4, to rank the five proposed APDs according to the degree of polarization which each APD was estimated by the panels to generate on each PNC.

Table 5.3.1 presents the APD rankings in terms of their relative conflict polarization. The reader of this table will note the number 32 under APD 1, "Frequency of APD in rank Column" refers to the fact that the two panels reviewing APD 1 ranked it first 32 times across all PNCs. When the frequency in rank is multiplied by the rank value one obtains a rank score which, when summed, provides the over-all conflict polarization number for the APD. The summed ranks across PNCs for all panels, recorded at the bottom of Table 5.3.1, are presented in order on Table 5.3.2.

Table 5.3.2 reports that APD 5, with an over-all summed rank value of 46, was found to be the least polarizing of the APDs across the 21 PNCs. APD 3 followed in second place which was, in turn, followed by APDs 2 and 4 tied for third place. APD 1 is found to be the most polarizing. Yet, inspection of Tables 5.3.1 and 5.3.2 reveals that the summed rank values for second, third, and fourth place APDs are really very close. The last ranked APD 1 is only two summed rank units from the second ranked APD 3.

## 5.4 Synthesis and Conclusion

The two dimensions of social well-being—futures for choice opportunities foregone and social conflict polarization—represent separate analyses which were performed independently and each can stand alone. Yet, there is value in juxtaposing the results of the two analyses keeping in mind that units of futures foregone are very different from units of conflict polarization. It is, nevertheless, of use to examine the APD rankings which emerged out of the two analyses. Table 5.4 juxtaposes the results of the two analyses for comparison. The reader will note that there is

## TABLE 5.3.1

## NATIONAL APD RANKING BY ALL PANELS

| | APD 1 | | APD 2 | | APD 3 | | APD 4 | | APD 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| RANK | Frequency of APD in Rank Across All PNCs for All Panels | Rank Score (Frequency in Rank X Rank Value) | Frequency of APD in Rank Across All PNCs for All Panels | Rank Score (Frequency in Rank X Rank Value) | Frequency of APD in Rank Across All PNCs for All Panels | Rank Score (Frequency in Rank X Rank Value) | Frequency of APD in Rank Across All PNCs for All Panels | Rank Score (Frequency in Rank X Rank Value) | Frequency of APD in Rank Across All PNCs for All Panels | Rank Score (Frequency in Rank X Rank Value) |
| 1 | 32 | 32 | 29 | 29 | 31 | 31 | 30 | 30 | 30 | 30 |
| 2 | 3 | 6 | 10 | 20 | 8 | 16 | 9 | 18 | 8 | 16 |
| 3 | 5 | 15 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 4 | 0 | 0 |
| | Summed Ranks Across PNCs = for All Panels | 53 | | 52 | | 51 | | 52 | | 46 |

Table 5.3.2

National APD Ranking

| Rank | | APD | | Summed Rank Value | |
|---|---|---|---|---|---|
| 1 | | 5 | | 46 | |
| 2 | | 3 | | 51 | |
| 3 | tie | 2 | tie | 52 | tie |
| 3 | | 4 | | 52 | |
| 4 | | 1 | | 53 | |

### Table 5.4

### Synthesizing Futures Foregone with Conflict Polarization APD Ranks

| APD | Futures Foregone Ranking | Conflict Polarization Ranking | Social Well-Being Sum of Rankings Across Analyses |
|---|---|---|---|
| 1 | 3 | 4 | 7 |
| 2 | 4 | 2 | 6 |
| 3 | 1 | 3 | 4 |
| 4 | 5 | 2 | 7 |
| 5 | 2 | 1 | 3 |

no clear and dominant winner--i.e., an APD which clearly wins on both dimensions of the analysis. There is no clear and dominant loser either--an APD that is last ranked on both analyses. APD five which is first ranked by the conflict analysis is second ranked by the futures foregone analysis. APD 1 which is last ranked in terms of conflict is third ranked in the futures foregone analysis. It may well be that the reader will wish to draw no other conclusion than that each alternative represents a mix of better and worse aspects. Yet, it is possible to sum the futures foregone rank with the conflict polarization rank for each APD and then compare APDs in terms of their over-all social well-being rank. If one does this, one quickly sees that APD 5 scores the lowest over-all ranking by virtue of its second rank in futures foregone analysis and its first rank in conflict analysis. APD 3 then takes second place in the over-all ranking with a value of 4. APD 2 assumes third place in the over-all ranking with a value of 6 and APDs 1 and 4 tie for fourth and last place with sums of 7 each. In this sense, APD 5 is clearly preferable from the over-all social well-being standpoint, followed in turn by APDs 3 2 and 1/4. It must be emphasized that all rankings presented in this final chapter are based on the impacts of APDs generated across all PNCs studied across the nation. The first ranked APD at the national level may not be the first ranked APD at any given PNC level or, within that PNC, at any given activity level. The reader may well wish to return to the Tables presenting more detailed data breakdowns in Chapters 3 and 4 and in Appendices Vol. 1 (Futures Foregone), Vol. 2 (Social Conflict Polarization).

# ATTACHMENT A

## A.1 LIST OF ORGANIZATIONS INVITED TO ATTEND SOCIAL CONFLICT WORKSHOP

-AND-

## A.2 ORGANIZATIONS REPRESENTED IN THE SOCIAL CONFLICT WORKSHOP

ATTACHMENT A.1

## LIST OF ORGANIZATIONS INVITED
## TO ATTEND SOCIAL CONFLICT WORKSHOP

American Farm Bureau Federation
American Fisheries Society
American Forestry Association
American Horse Council
American Mining Congress
American Pulpwood Association
Chamber of Commerce of the United States
Common Cause
Environmental Law Institute
International Snowmobile Industry Association
National Academy of Sciences
National Association of Conservation Districts
National Coal Association
National Parks and Conservation Association
National Association of Independent Lumbermen
National Rural Electric Cooperative Association
National Science Foundation
Natural Resources Defense Council
North American Wildlife Foundation
Resources for the Future
Sport Fishing Institute
U. S. Water Resources Council
The Wilderness Society
The Wildlife Society

ATTACHMENT A.2

## Organizations Represented by Participants In The Social Conflict Exercise

| ORGANIZATION REPRESENTED: * | # OF PARTICIPANTS REPRESENTING ORGANIZATION: |
|---|---|
| AMERICAN FORESTRY ASSOCIATION | 1** |
| AMERICAN PULPWOOD ASSOCIATION | 1** |
| NATIONAL FOREST PRODUCTS ASSOCIATION | 1** |
| NATIONAL PARKS AND CONSERVATION ASSOCIATION | 1 |
| NATIONAL RIFLE ASSOCIATION | 1 |
| NATIONAL TRAILS COUNCIL | 1 |
| STATE & PRIVATE FORESTRY | 1 |
| U.S. FOREST SERVICE | 10 |
| WILDLIFE SOCIETY | 1 |

*NOTE: It was hoped that more people representing non-governmental organizations would have participated in the social conflict exercise. Attachment B.1.2.a. lists the organizations which were invited to participate.(next page)

**NOTE: On any given day of the social conflict workshop there was one person represented by these organizations, but the original panel members provided substitutes for those days when they could not attend.

# ATTACHMENT B

B.1 PARTICIPANT KNOWLEDGE ESTIMATE FORM (WEST)

B.2 PARTICIPANT KNOWLEDGE ESTIMATE FORM (EAST)

B.3 PARTICIPANT KNOWLEDGE SCORES (WEST)

B.4 PARTICIPANT KNOWLEDGE SCORES (EAST)

ATTACHMENT B.1

# KNOWLEDGE ESTIMATE FORM (WEST)

**Participant Number** ____________

**Days of workshop in which I participated :**

| | circle |
|---|---|
| Thursday, JULY 12 | x |
| Friday, JULY 13 | x |
| Monday,JULY 16 | x |
| Tuesday, JULY 17 | x |

**Reflecting on the PNC's which you have examined in the course of this workshop (consult your ring binder) would you say that you:**

**2 - had substantial experience with the general area represented by the PNC**

**1 - had limited experience with the general area represented by the PNC**

**0 - had no experience with the general area represented by the PNC**

**WEST**

| circle number reflecting your experience | | | PNC |
|---|---|---|---|
| 2 | 1 | 0 | 14-6 western spruce-fir forest |
| 2 | 1 | 0 | 58-5 gramma buffulo grass |
| 2 | 1 | 0 | 60-5 wheat grass-blue stem-needle grass |
| 2 | 1 | 0 | 62-5 blue-stem-gramma prairie |
| 2 | 1 | 0 | 63-5 sand sage-blue stem prairie |
| 2 | 1 | 0 | 40-7 fescue-oat grass |
| 2 | 1 | 0 | 47-5 grammagalleta steppe |
| 2 | 1 | 0 | 30-7 coastal sage brush |
| 2 | 1 | 0 | 66-5 blue stem prairie |
| 2 | 1 | 0 | 49-6 sage brush steppe |
| 2 | 1 | 0 | 89-5 northern flood plain forest |

# ATTACHMENT B.2

# KNOWLEDGE ESTIMATE FORM (EAST)

Participant Number ___________

Days of workshop in which I participated :

| | circle |
|---|---|
| Thursday, JULY 12 | x |
| Friday, JULY 13 | x |
| Monday, JULY 16 | x |
| Tuesday, JULY 17 | x |

Reflecting on the PNC's which you have examined in the course of this workshop (consult your ring binder) would you say that you:

2 - had substantial experience with the general area represented by the PNC

1 - had limited experience with the general area represented by the PNC

0 - had no experience with the general area represented by the PNC

## EAST

| circle number reflecting your experience | | | PNC | |
|---|---|---|---|---|
| 2 | 1 | 0 | 88-3 | southern spruce fir |
| 2 | 1 | 0 | 105-3 | sand pine scrub |
| 2 | 1 | 0 | 102-3 | southern mixed forest |
| 2 | 1 | 0 | 106-3 | sub tropical pine forest |
| 2 | 1 | 0 | 58-4 | gramma-buffalo grass |
| 2 | 1 | 0 | 77-4 | juniper-oak |
| 2 | 1 | 0 | 82-3 | cypruss savanna |
| 2 | 1 | 0 | 97-3 | northern hardwoods |
| 2 | 1 | 0 | 95-4 | appalachian oak forest |
| 2 | 1 | 0 | 91-5 | oak hickory |

## Participant Knowledge Scores
## By West PNCs

| West PNCs | Panel #1 Knowledge Score | % of Highest Potential Knowledge Score | Panel #3 Knowledge Score | % of Highest Potential Knowledge Score | Reversals* |
|---|---|---|---|---|---|
| 14-6 | 3 | 38 | 2 | 50 | |
| 58-5 | 7 | 88 | 3 | 75 | |
| 60-5 | 5 | 63 | 2 | 50 | |
| 62-5 | 4 | 50 | 3 | 75 | |
| 63-5 | 5 | 63 | 3 | 30 | |
| 40-7 | 5 | 63 | 2 | 20 | |
| 47-5 | 4 | 50 | 1 | 10 | |
| 30-7 | 5 | 63 | 1 | 10 | |
| 66-5 | 2 | 25 | 5 | 50 | |
| 49-6 | 4 | 50 | 4 | 40 | |
| 89-5 | 5 | 63 | 7 | 70 | X |
| Overall Knowledge Score | 49 | | 33 | | |
| % of Highest Potential Knowledge Score on all PNCs | | 56 | | 25 | |

*NOTE: By "Reversal" we mean those cases where one panel assigned a top rank to an APD while the other panel assigned the same APD the bottom rank. A clearcut reversal in panel rankings occurred on PNC 89-5.

## Participant Knowledge Scores
## By East PNCs

| East PNCs | Panel #1 Knowledge Score | % of Highest Potential Knowledge Score | Panel #3 Knowledge Score | % of Highest Potential Knowledge Score | Reversals* |
|---|---|---|---|---|---|
| 88-3 | 2 | 25 | 3 | 38 | |
| 105-3 | 4 | 50 | 3 | 38 | |
| 102-3 | 4 | 50 | 5 | 63 | |
| 106-3 | 1 | 13 | 2 | 25 | |
| 58-4 | 1 | 13 | 1 | 13 | |
| 77-4 | 1 | 13 | 3 | 38 | |
| 82-3 | 1 | 13 | 2 | 25 | |
| 97-3 | 7 | 88 | 5 | 63 | |
| 95-4 | 4 | 50 | 6 | 75 | |
| 91-5 | 2 | 25 | 3 | 38 | |
| Overall Knowledge Score | 27 | | 33 | | |
| % of Highest Potential Knowledge Score on all PNCs | | 34 | | 41 | |

NOTE: By "Reversal" we mean those cases where one panel assigned a top rank to an APD while the other panel assigned the same APD the bottom rank. No reversals occurred on eastern PNCs.

# ATTACHMENT C

C.1 INSTRUMENT USED TO DETERMINE PANEL MEMBER'S KNOWLEDGE OF LAND USE ISSUES IN DIFFERENT REGIONS AND IDEOLOGICAL PREFERENCES

C.2 Distribution of Panel Participants By Ideological Preference

Attachment C.1

## INSTRUMENT USED TO DETERMINE PANEL MEMBER'S KNOWLEDGE OF LAND USE ISSUES IN DIFFERENT REGIONS AND IDEOLOGICAL PREFERENCES

Name ______________________________________________

1. Male ( ) 2. Female ( )

2. Present employer: ______________________________

3. Number of years with present employer: ____________

4. Present position (i.e., job title): _______________

5. Number of years employed in present position: ____________

6. Primary responsibility of present position: ______________

______________________________________________

7. Looking at the attached map, please identify and rank the three regions which you have the most knowledge about when it comes to land use issues (where 1 = most knowledge; 2 = second most knowledge; 3 = third most knowledge)

| | |
|---|---|
| _____ Northeast | _____ Rocky Mountain and Great Plains |
| _____ Southeast | _____ Pacific Northwest |
| _____ North Central | _____ Pacific Southwest |
| _____ South Central | _____ Alaska |

8. Please circle the number which corresponds most closely with your feelings about the following statements.

   a. Demands of the market place should be the prime criterion in determining land usage patterns.

   Strongly disagree -3 -2 -1 0 +1 +2 +3 Strongly Agree

   b. The well-being of any society is directly related to the continuing expansion of its business and industry.

   Strongly disagree -3 -2 -1 0 +1 +2 +3 Strongly Agree

   c. The current concern over environmental quality has gained too much prominence in current efforts to develop landbased resources.

   Strongly disagree -3 -2 -1 0 +1 +2 +3 Strongly Agree

9. To what degree do you think public involvement is important in making decisions concerning the use of public lands?

   High Importance +3 +2 +1 0 -1 -2 -3 No Importance

10. To what degree do you think the Forest Service considers public involvement important in making decisions concerning use of public lands?

   High Importance +3 +2 +1 0 -1 -2 -3 No Importance

## ATTACHMENT C.2

Scale of Participants Ideological Preferences*

| | Environmental | | | | | | | | Commodity Prod. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDEOLOGY SCORES | -7 | -6 | -4 | -3 | -1 | 0 | +1 | +2 | +4 | +5 | +6 |
| NUMBER OF PARTICIPANTS RECEIVING SCORE | 2 | 2 | 1 | 1 | 2 | 2 | 4 | 1 | 1 | 1 | 1 |

*NOTE: This scale includes all participants in the social conflict workshop, including those who did not participate on all days of the exercise. Ideology scores were computed for each participant by summing the positive and/or negative values indicated on items 8a-8c of the instrument presented in Attachment C.1.

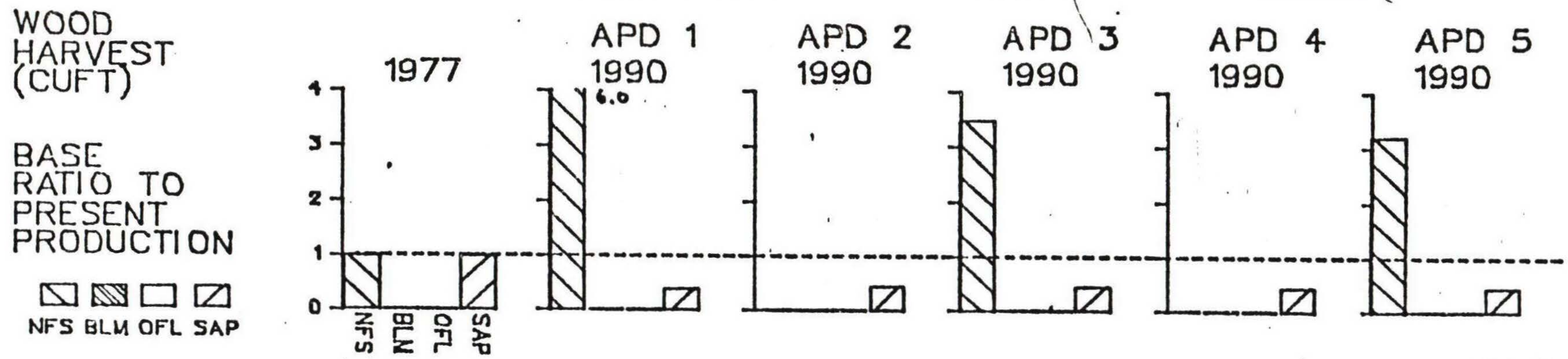
# ATTACHMENT D

## EXAMPLES OF ACTUAL RESPONSE SHEETS USED BY PANEL PARTICIPANTS IN MAKING CONFLICT POSITION ESTIMATES

PARTICIPANT NUMBER ☐

# RESPONSE SHEET

PNC 105-3 ①



Do not delete

| | Present | | | | | APD #1 | | | | | APD #2 | | | | | APD #3 | | | | | APD #4 | | | | | APD #5 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf |
| FARMING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| RANCHING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| AGRICULTL WATER | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| MUNICIPAL WATER | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| ~~TIMBER~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ |
| MINERAL DEVELMT | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| ENERGY DEVELMT | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| BUSINESS SERV | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| RETAIL SALES & SERV | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| DISPRSD:NON-MTR | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| DISPRSD:MOTORIZED | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| PICNICG & CAMPING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| ~~DOWNHILL SKIING~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ |
| PRIVATE REC DEV | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| WILDERNESS | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| WILDLIFE NON-HARVEST | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| WILDLIFE:HARVEST | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |

* sa=strongly against(-2); a=against(-1); n=neutral(0); f=for(+1); sf=strongly for(+2); leave blank for non-applicable

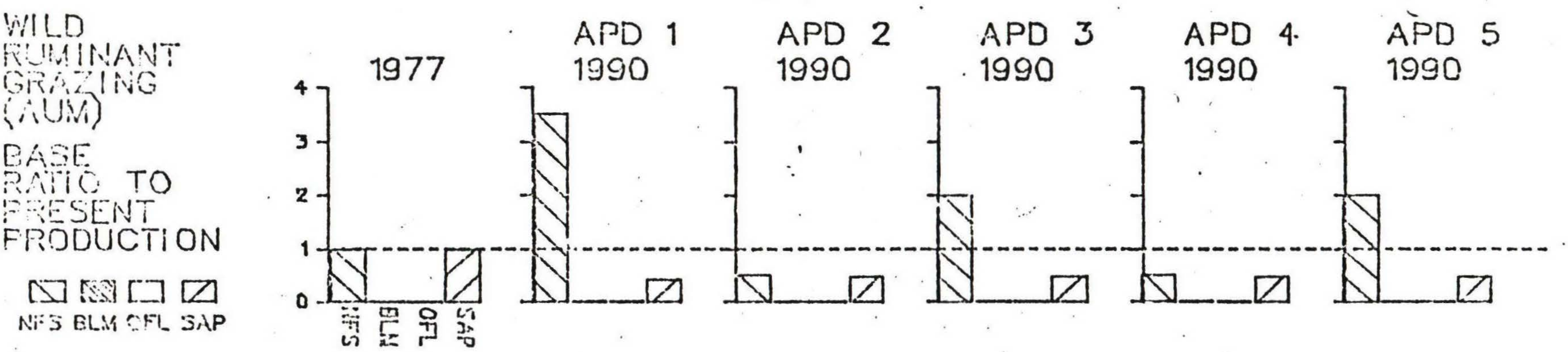
PARTICIPANT NUMBER ☐

# RESPONSE SHEET

PNC 105-3

WILD RUMINANT GRAZING (AUM)

BASE RATIO TO PRESENT PRODUCTION



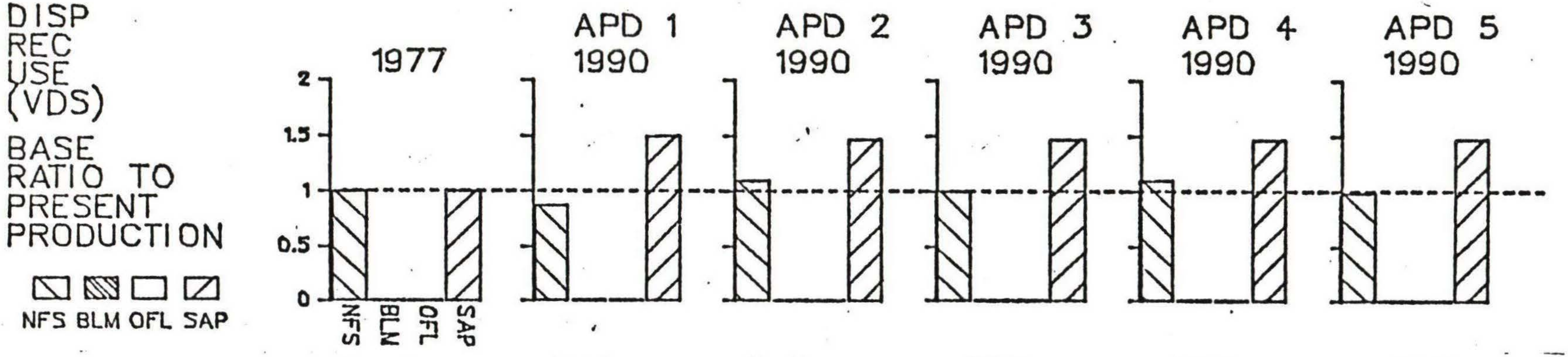
| | Present | | | | | APD #1 | | | | | APD #2 | | | | | APD #3 | | | | | APD #4 | | | | | APD #5 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf |
| FARMING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| RANCHING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| AGRICULTL WATER | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| MUNICIPAL WATER | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| TIMBER | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| MINERAL DEVELMT | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| ENERGY DEVELMT | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| BUSINESS SERV | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| RETAIL SALES & SERV | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| DISPRSD:NON-MTR | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| DISPRSD:MOTORIZED | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| PICNICG & CAMPING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| DOWNHILL SKIING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| PRIVATE REC DEV | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| WILDERNESS | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| WILDLIFE NON-HARVEST | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| [illegible] | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |

[illegible] against(-2); against(-1); neutral(0); for(+1); strongly for(+2); leave blank for non-applicable

PARTICIPANT NUMBER ☐

# RESPONSE SHEET

PNC 105-3



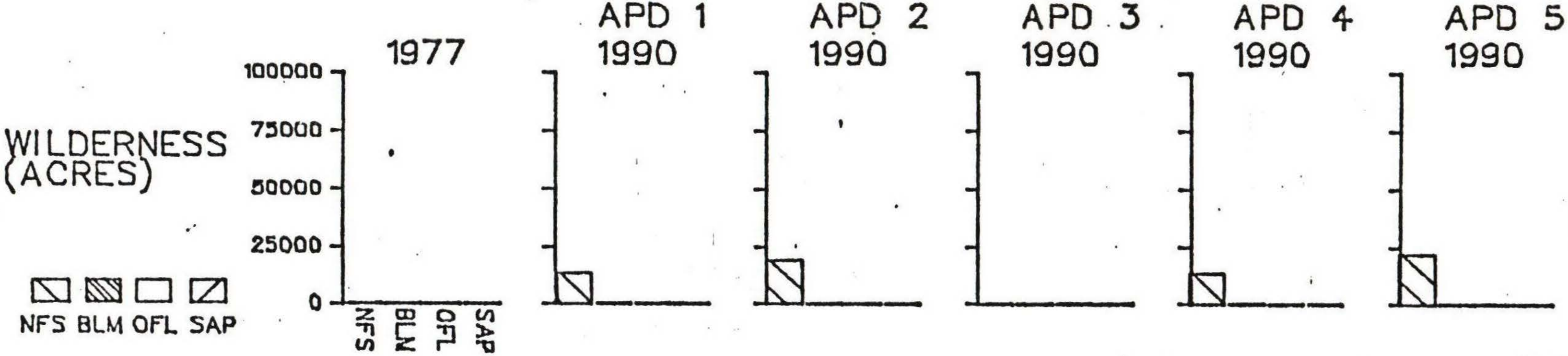
| | Present | | | | | APD #1 | | | | | APD #2 | | | | | APD #3 | | | | | APD #4 | | | | | APD #5 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf |
| FARMING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| RANCHING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| AGRICULTL WATER | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| MUNICIPAL WATER | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| TIMBER | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| MINERAL DEVELMT | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| ENERGY DEVELMT | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| BUSINESS SERV | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| RETAIL SALES & SERV | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| DISPRSD:NON-MTR | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| DISPRSD:MOTORIZED | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| PICNICG & CAMPING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| ~~DOWNHILL SKIING~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ |
| PRIVATE REC DEV | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| WILDERNESS | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| WILDLIFE NON-HARVEST | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| WILDLIFE:HARVEST | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |

* sa=strongly against(-2); a=against(-1); n=neutral(0); f=for(+1); sf=strongly for(+2); leave blank for non-applicable

PARTICIPANT NUMBER ☐

# RESPONSE SHEET

PNC 105-3



| | Present | | | | | APD #1 | | | | | APD #2 | | | | | APD #3 | | | | | APD #4 | | | | | APD #5 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf | sa | a | n | f | sf |
| FARMING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| RANCHING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| AGRICULTL WATER | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| MUNICIPAL WATER | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| TIMBER | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| MINERAL DEVELMT | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| ENERGY DEVELMT | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| BUSINESS SERV | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| RETAIL SALES & SERV | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| DISPRSD:NON-MTR | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| DISPRSD:MOTORIZED | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| PICNICG & CAMPING | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| ~~DOWNHILL SKIING~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ | ~~-2~~ | ~~-1~~ | ~~0~~ | ~~+1~~ | ~~+2~~ |
| PRIVATE REC DEV | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| WILDERNESS | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| WILDLIFE NON-HARVEST | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |
| WILDLIFE:HARVEST | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 | -2 | -1 | 0 | +1 | +2 |

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